EXHIBIT B

Singular Computing LLC v. Google LLC

C.A. No. 1:19-cv-12551-FDS

Singular Computing's Trial Exhibit List

Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0201	CRA0000144	CRA0000146	November 18, 2013 Email from R. Wronski to M. Felix re: a request and ideas for moving the license forward	R; H; A; 403
TX0202	CRA0001285	CRA0001297	March 27, 2013 Charles River Analytics Independent Contractor Agreement with Singular	R; H; A; 403
TX0203	CRA0001349	CRA0001353	May 7, 2012 Charles River Analytics with Independent Contractor Agreement with Singular (MAD-HATTER)	R; H; A; 403
TX0204	CRA0001996	CRA0001997	September 4, 2014 Letter from Charles River Analytics to Office of Naval Research re: request to remove Singular Technology as a subcontractor and add Singular License Agreement	R; H; A; 403
TX0205	CRA0002063	CRA0002074	October 2013 License Agreement between Singular Computing and Charles River Analytics (not executed)	R; H; A; 403
TX0206	GOOG-SING-00000019	GOOG-SING-00000020	Document "Performance" *See* go/tpu-perf	R; H; 703
TX0207	GOOG-SING-00000233	GOOG-SING-00000235	Document "BarnaCore Host Software," last edited February 12, 2018	R; H; 403; 703; LF
TX0208	GOOG-SING-00000375	GOOG-SING-00000378	Document "Mixed-precision Training on TPU (Using Bfloat16 for Activations)," edited March 16, 2020	R; H; 703; LF
TX0209	GOOG-SING-00000387	GOOG-SING-00000415	March 1, 2019 Platforms for Machine Learning v2	
TX0211	GOOG-SING-00000671	GOOG-SING-00000696	January 2020 Presentation slides "TPU Trajectory"	R; H; 403; 703; MIL
TX0212	GOOG-SING-00002124	GOOG-SING-00002177	2017 Presentation slides "Machine Learning for Systems and Systems for Machine Learning" by Jeff Dean (NIPS 2017 ML Systems presentation)	R; H; 703
TX0213	GOOG-SING-00003752.R	GOOG-SING-00003780.002.R	Platforms for Machine Learning - v2, Current Perf/TCO & Competitive Analysis to Inform Strategic Vision, updated March 2019	
TX0214	GOOG-SING-00004490	GOOG-SING-00004587	June 25, 2015 Presentation slides "Jellyfish System Planning Phase Exit/Update" for jellyfish team, contacts A. Swing, E. Wilcox	R; H; LF; 403; 703
TX0215	GOOG-SING-00006062	GOOG-SING-00006089	Presentation slides "Dragonfish HW Overview"	R; H; LF; 703
TX0216	GOOG-SING-00007708	GOOG-SING-00007708	Excel Spreadsheet "POD IT Infrastructure Costs" (native Excel)	R; H; LF; 703
TX0217	GOOG-SING-00007808	GOOG-SING-00007862	Dragonfish Dev Entry CFR dated December 12, 2016.	R; H; LF; 703
TX0218 (DUPE of TX0219)	GOOG-SING-00009745	GOOG-SING-00009748	May 17, 2017 Article "Build and train machine learning models on our new Google Cloud TPUs"	R; H
TX0219	GOOG-SING-00009745	GOOG-SING-00009748	May 17, 2017 Google Blog Article "Build and train machine learning models on our new Google Cloud TPUs" by Jeff Dean, Urs Holzle	R; H
TX0222	GOOG-SING-00012782	GOOG-SING-00012813	ImageNet is the New MNIST - Chris Ying	R; H; LF; 403; 703
TX0223	GOOG-SING-00012871	GOOG-SING-00012914	December 11, 2018 Presentation slides "Training image and text classification models faster with TPUs" by Lak Lakshmanan	R; H; LF; 703
TX0225	GOOG-SING-00014686	GOOG-SING-00014733	April 30, 2013 Article "Google Neural Models for Voice, Vision, and Text" by Jeff Dean	R; H; 703

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0226	GOOG-SING-00014686-00014733; GOOG-SING-00235767-00235798; GOOG-SING-00070562-00070584	GOOG-SING-00014686-00014733; GOOG-SING-00235767-00235798; GOOG-SING-00070562-00070584	July 13, 2021 Email string from Matthias Kamber to Dan McGonagle re slides in NYT article	R; H; LF; 703
TX0227	GOOG-SING-00178314	GOOG-SING-00178569	Presentation slides "Accelerated Machine Learning in the Cloud: GPUs Cloud TPUs, and More" John Barrus, Zak Stone	R; H; LF; 403; 703
TX0228	GOOG-SING-00019908	GOOG-SING-00019926	November 9, 2015 TensorFlow: Large-Scale Machine Learning on Heterogeneous Distributed Systems	R; H; LF; 703
TX0229	GOOG-SING-00019927	GOOG-SING-00019936	A Study of BFLOAT16 for Deep Learning, Facebook	R; H; LF; 703
TX0233	GOOG-SING-00025357	GOOG-SING-00025487	Neural Networks and Systolic Array Design, Chapters 1-4, Zhang and Pal 2002	H; LF; 403; 703
TX0238	GOOG-SING-00026944	GOOG-SING-00026946	June 25, 2020 "Towards measuring the return of the Investment in ML 2020-Q2"	R; H; LF; 403; 703; MIL
TX0239	GOOG-SING-00026944.R	GOOG-SING-00026946.R	June 15, 2020 "Towards Measuring the Return on the Investment in ML, 2020-Q2" (re-produced)	R; H; LF; 403; 703; MIL
TX0240	GOOG-SING-00026947	GOOG-SING-00026947	March 2, 2017 Notes entitled discussion with Joe Bates	R; H; 403; LF; MIL
TX0241	GOOG-SING-00027368	GOOG-SING-00027473	Cloud TPU Business & Product Update Jan 2020	R; H; LF; 403; 703
TX0242	GOOG-SING-00027474	GOOG-SING-00027476	April 11, 2018 A Projection of Datacenter Building and Power Demand for Upcoming ML Accelerators	R; H; LF; 403; 703
TX0245	GOOG-SING-00027662	GOOG-SING-00027714	Undated Presentation slides "TPU and GPU Comparison for ML Training "	H; LF; 403; 703
TX0246	GOOG-SING-00027793	GOOG-SING-00027835	Undated Presentation slides "Google Cloud TPU"	H; LF; 403; 703
TX0247	GOOG-SING-00028192	GOOG-SING-00028192	November 3, 2010 Email from J. Bates to A. Teller re: Re: via Justin showing attachment "Bates overview Nov2010.pdf"	R, H, 403, MIL
TX0248	GOOG-SING-00028193	GOOG-SING-00028203	November 2010 Bates Presentation slides "Computing 10,000x More Efficiently" by Joseph Bates	R, H, LF; 403, MIL
TX0249	GOOG-SING-00028204	GOOG-SING-00028206	November 9, 2010 Email chain from A. Teller to J. Bates re: I'm in the lounge…	R, H, 403, LF, MIL
TX0250	GOOG-SING-00028208	GOOG-SING-00028209	November 18, 2010 Email from A. Teller to J. Bates re: Shall we set another time to talk?	R, H, 403, LF, MIL
TX0251	GOOG-SING-00028210	GOOG-SING-00028210	November 20, 2010 Email from Teller to Bates re: Setting a time for Joe to come give a talk	R, H, 403, LF, MIL
TX0252	GOOG-SING-00028211	GOOG-SING-00028224	December 9, 2010 Email chain from J. Bates to S. Thrun cc: A. Teller, S. Gandara re: slides to discuss today at 11 PT with attachment labelled "Sebastaian (sic) Thrun overview Dec2010.pdf" - December 2010 Singular Presentation "Computing 10,000x More Efficiently - Technology and Applications Overview"	R, H, 403, LF, MIL
TX0253	GOOG-SING-00028213	GOOG-SING-00028224	December 2010 Presentation slides "Computing 10,00X More Efficiently" by Joseph Bates	R, H, 403, MIL
TX0254	GOOG-SING-00028233	GOOG-SING-00028235	December 20, 2010 Email string from Bates to Teller re: phone call timing	R, H, 403, LF, MIL

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0255	GOOG-SING-00028238	GOOG-SING-00028238	January 5, 2011 Email from Teller to Bates re: Any news on whether we can resolve the IP issues through a small change to the NDA?	R, H, 403, LF, MIL
TX0256	GOOG-SING-00028243	GOOG-SING-00028246	January 26, 2011 Email from Teller to Bates re: how to take next steps	R, H, 403, LF, MIL
TX0257	GOOG-SING-00028258	GOOG-SING-00028260	February 6, 2011 Email from Teller to Bates re: SIMD, GoogleX	R, H, 403, LF, MIL
TX0258	GOOG-SING-00028272	GOOG-SING-00028277	March 1, 2011 Email from Holck to Bates cc Isaac Taylor, Teller re: NDA with SINGULAR COMPUTING LLC, enclosing redline Non-Disclosure Agreement and execution copy of Non-Disclosure Agreement	R, H, 403, LF, MIL
TX0259	GOOG-SING-00028274	GOOG-SING-00028275	November 1, 2010 Non-Disclosure Agreement between Google and Singular	R, H, 403, MIL
TX0260	GOOG-SING-00028276	GOOG-SING-00028277	November 1, 2010 Draft of Non-Disclosure Agreement between Google and Singular	R, H, 403, MIL, C
TX0261	GOOG-SING-00028280	GOOG-SING-00028282	March 1, 2011 Email from E. Holck to J. Bates cc I. Taylor, A. Teller re: NDA with SINGULAR COMPUTING LLC, and enclosing fully executed Google/Singular MNDA Agreement	R, H, 403, LF, MIL
TX0262	GOOG-SING-00028281	GOOG-SING-00028282	March 1, 2011 Executed Nondisclosure Agreement between Google and Singular, effective November 10, 2010 (executed March 1, 2011)	R, 403, MIL
TX0263	GOOG-SING-00028297	GOOG-SING-00028299	April 27, 2011 Email chain from A. Teller to J. Bates re: idea on IP	R, H, 403, LF, MIL
TX0264	GOOG-SING-00028300	GOOG-SING-00028301	May 5, 2011 Email from Teller to Bates re: approach to pass Google legal	R, H, 403, LF, MIL
TX0265	GOOG-SING-00028302	GOOG-SING-00028303	May 11, 2011 Email from Teller to Bates re: Sorry but...	R, H, 403, LF, MIL
TX0266	GOOG-SING-00028304	GOOG-SING-00028304	May 18, 2010 Email from Teller to Bates re James Gosling	R, H, 403, LF, MIL
TX0267	GOOG-SING-00028307	GOOG-SING-00028309	May 20, 2011 Email from Bates to Teller re: June 24-27?	R, H, 403, LF, MIL
TX0268	GOOG-SING-00028310	GOOG-SING-00028310	May 22, 2011 Email from Teller to Bates re: Headline	R, H, 403, LF, MIL
TX0269	GOOG-SING-00028313	GOOG-SING-00028313	June 9, 2011 Email from Teller to Bates re: Are you around in Boston today or tomorrow?	R, H, 403, LF, MIL
TX0270	GOOG-SING-00028314	GOOG-SING-00028320	June 13, 2011 Email from Teller to Bates cc Gandara re: where to meet at Google	R, H, 403, LF, MIL
TX0271	GOOG-SING-00028327	GOOG-SING-00028328	June 13, 2011 Email from Teller to Bates re: Harvard biz school prof on optimization market	R, H, 403, LF, MIL
TX0272	GOOG-SING-00028329	GOOG-SING-00028330	June 15, 2011 Email from Teller to Bates cc: Neven re: Joe's brief Summary of conversation with Harmut	R, H, 403, LF, MIL
TX0273	GOOG-SING-00028331	GOOG-SING-00028332	June 22, 2011 Email from Bates to Teller re: applications, markets, deal questions	R, H, 403, LF, MIL
TX0274	GOOG-SING-00028335	GOOG-SING-00028336	June 27, 2011 Email string from A. Teller to J. Bates, re: Hello -- how about this approach	R, H, 403, LF, MIL
TX0276	GOOG-SING-00028354	GOOG-SING-00028355	July 12, 2011 Email from Teller to Bates re: So I had an interesting conversation with Sebastian about possibly bringing you onboard...	R, H, 403, LF, MIL

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TX0278	GOOG-SING-00028361	GOOG-SING-00028361	May 2, 2012 Email from Teller to Bates re: Do you have a chip for someone to play with and rough power and pricing info if they asked?	R, H, 403, LF, MIL
TX0281	GOOG-SING-00028801	GOOG-SING-00028810	January 16, 2018 A New Golden Age in Computer Architecture: Empowering the Machine Learning Revolution	R; H; LF
TX0283	GOOG-SING-00029813	GOOG-SING-00029814	January 23, 2014 Email string from Jeff Dean to Joseph Bates re: Good to meet you	R, H, 403, LF, MIL
TX0284	GOOG-SING-00029815	GOOG-SING-00029816	January 23, 2014 Email from J. Dean to Bates re: Good to meet you	R, H, 403, LF, MIL
TX0285	GOOG-SING-00029832	GOOG-SING-00029833	October 30, 2014 Email from Jeff Dean to Monga re: Offload accelerators	R, H, 403, LF
TX0286	GOOG-SING-00031073	GOOG-SING-00031075	March 12, 2019 Email string from N. Patil to M. Jeong re: Fwd: Status of AdBrain training on TPUs	R, H, 403, LF
TX0290	GOOG-SING-00032944	GOOG-SING-00032952	September 29, 2014 Email string from O. Temam to R. Boyle, cc to N. Jouppi, A. Swing, et al re: Jellyfish infos	R, H, 403, LF; 703
TX0291	GOOG-SING-00033046	GOOG-SING-00033047	October 10, 2014 Email string from O. Temam to N. Jouppi re: 2014 Q4 OKRs - Invitation to edit	R; H; 403; LF; 703
TX0292	GOOG-SING-00038365	GOOG-SING-00038366	April 10, 2019 Email chain from D. Patterson to Moshe Vardi, Norm Jouppi and Clifford Young	R; H; 403; LF; 703
TX0294 (DUPE of TX0295)	GOOG-SING-00038605	GOOG-SING-00038609	January 20, 2017 Email string from N. Sexauer to J. Bates cc Spalink re: Feb 2, Morning, Bates talk at Google (attachment not included - see Felten depo ex. 4 for version with attachment)	R, H, 403, LF; MIL
TX0295	GOOG-SING-00038605	GOOG-SING-00038610	January 20, 2017 Email string from N. Sexauer to J. Bates cc Spalink re: Feb 2, Morning, Bates talk at Google enclosing map of Google campus	R, H, 403, LF; MIL
TX0296	GOOG-SING-00038617	GOOG-SING-00038621	February 9, 2017 Email from Felten to Bates cc Sexauer re: Feb 2, Morning	R, H, 403, LF; MIL
TX0297 (DUPE of TX0300)	GOOG-SING-00038634	GOOG-SING-00038640	March 2, 2017 Email from J. Wall to J. Bates cc: O. Felten, A. Patil, J. Laudon, C. Tornabene re: March 8-10 Attachments: SingularComputingMANDA20170301.pdf	R, H, 403, LF
TX0298	GOOG-SING-00038628	GOOG-SING-00038629	February 21, 2017 Email from Laudon to Bates re: March 8-10	R, H, 403, LF
TX0299	GOOG-SING-00038632	GOOG-SING-00038633	February 22, 2017 Email string from O. Felten to J. Bates re: March 8-10	R, H, 403, LF
TX0301	GOOG-SING-00040471	GOOG-SING-00040476	June 13, 2017 - 2017/2018 Supplemental HC for Cloud TPU	R, H, 403, LF; 703
TX0302	GOOG-SING-00041122	GOOG-SING-00041146	May 13, 2014 Presentation slides "SeaStar Deep Mind Summit" cliffy@, jouppi@	R; H; 403; LF; 703
TX0304	GOOG-SING-00042623	GOOG-SING-00042657	PFC ICI Link Stack Microarchitecture, updated October 19, 2018	R; H; 403; LF; 703
TX0305	GOOG-SING-00043486	GOOG-SING-00043522	Document "AdBrain on TPU Enablement and Performance Improvements" Updated September 29, 2019	R; H; 403; LF; 703
TX0306	GOOG-SING-00043557	GOOG-SING-00043638	Presentation Slides "AdBrain Training on Dragonfish, Platforms Performance and AdBrain Teams" for Deepsea Co-design Meetings March 11, 2019 and March 18, 2019	R; H; 403; LF; 703
TX0308	GOOG-SING-00045457	GOOG-SING-00045491	February 10, 2015 Presentation slides "JF Business Case update" A. Swing	R; H; 403; LF; 703

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0309	GOOG-SING-00045587	GOOG-SING-00045670	August 9, 2016 Performance Optimization for TensorFlow Platforms Seminar	R; H; 403; LF; 703
TX0310	GOOG-SING-00045671	GOOG-SING-00045683	June 21, 2017 "Jellyfish and Volta Comparison"	R; H; 403; LF; 703
TX0311	GOOG-SING-00047126	GOOG-SING-00047129	Document "TPU, Inc."	R; H; 403; LF; 703
TX0312	GOOG-SING-00047736	GOOG-SING-00047771	June 3, 2018 Presentation slides, AIDArc Keynote "Using TPUs to Design TPUs" by Cliff Young	R; H; 403; LF; 703
TX0313	GOOG-SING-00048090	GOOG-SING-00048109	Presentation "Challenges for Inference-only Datacenter Accelerators" updated April 17, 2018	R; H; 403; LF; 703
TX0315	GOOG-SING-00052412	GOOG-SING-00052417	August 25, 2015 CH/CM Feedback	R; H; 403; LF; 703
TX0316	GOOG-SING-00055555	GOOG-SING-00055582	August 17, 2014 Presentation slides "Seahorse, aka TBD" by N. Jouppi	R; H; 403; LF; 703
TX0317	GOOG-SING-00056319	GOOG-SING-00056320	October 15, 2014 Email from Temam to Dean re: Update on training accelerator	R; H; 403; LF; 703
TX0318	GOOG-SING-00063906	GOOG-SING-00063906	June 8, 2016 Email string from N. Jouppi to A. Swing and J. Dean re Jellyfish specs	R; H; 403; LF; 703
TX0319	GOOG-SING-00068162	GOOG-SING-00068169	Article "Metrics for Datacenter ML Platforms"	R; H; 403; LF; 703
TX0320	GOOG-SING-00070562	GOOG-SING-00070584	March 31, 2014 Presentation "SeaStar Chip Summit" Platforms chip projects & roadmap	R; H; 403; LF; 703
TX0321	GOOG-SING-00072813	GOOG-SING-00072842	November 21, 2014 Presentation slides "Q4 2014 Pl Eng All Hands"	R; H; 403; LF; 703
TX0322	GOOG-SING-00072843	GOOG-SING-00072866	January 27, 2015 Google: Jellyfish	R; H; 403; LF; 703
TX0323	GOOG-SING-00073121	GOOG-SING-00073138	July 22, 2015 Google Presentation Slides "SeaStar" TI All Hands, by Andy Swing, Cliff Young	R; H; 403; LF; 703; MIL
TX0324	GOOG-SING-00073622	GOOG-SING-00073677	April 5, 2017 Presentation slides "In-Data Center Performance Analysis of a Tensor Processing Unit" by D. Patterson	R; H; 403; LF; 703
TX0325	GOOG-SING-00074133	GOOG-SING-00074205	February 2017 Presentation slides "TPUs for GCE, TFRC, and Cloud ML Engine - TI Cloud Review" Presenters: John Barrus, Zak Stone, Justin Lawye	R; H; 403; LF; 703
TX0326	GOOG-SING-00074536	GOOG-SING-00074597	January 19, 2017 Presentation slides "Dragonfish Development entry PPR"	R; H; 403; LF; 703
TX0328	GOOG-SING-00078176	GOOG-SING-00078198	Presentation slides titled "JFC Challenges"	R; H; 403; LF; 703
TX0329	GOOG-SING-00078749	GOOG-SING-00078852	March 6, 2018 Article "4th Workshop on Platforms for Machine Learning"	R; H; 403; LF; 703
TX0331	GOOG-SING-00079150	GOOG-SING-00079174	"TPU Update for Search" dated April 11, 2019	R; H; 403; LF; 703
TX0332	GOOG-SING-00079853	GOOG-SING-00079887	Undated Document "VPU uArch Spec"	R; H; 403; LF; 703
TX0333	GOOG-SING-00081471	GOOG-SING-00081547	Document "BarnaCore uArch Spec," updated February 2, 2018	R; H; 403; LF; 703
TX0335	GOOG-SING-00083452	GOOG-SING-00083452	September 14, 2010 Email from A. Teller to Justin Boyan re: Great seeing you today!	R, H, 403, LF, MIL
TX0336	GOOG-SING-00083453	GOOG-SING-00083456	November 8, 2010 Email from Teller to Thrun re: Among other things...	R, H, 403, LF, MIL

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TX0337	GOOG-SING-00083457	GOOG-SING-00083468	December 1, 2010 Email chain from A. Teller to W. Mikanik re: Fwd: Interesting… enclosing Singular November 2010 Presentation Slides "Computing 10,000x More Efficiently"	R, H, 403, LF, MIL
TX0338	GOOG-SING-00083469	GOOG-SING-00083471	December 10, 2010 Email chain from S. Thrun to A. Teller re: discussion with Sebastian	R, H, 403, LF, MIL
TX0339	GOOG-SING-00083472	GOOG-SING-00083473	December 10, 2010 Email from Thrun to Teller re: discussion with Sebastian	R, H, 403, LF, MIL
TX0340	GOOG-SING-00083474	GOOG-SING-00083476	December 10, 2010 Email chain from W. Mikanik to A. Teller re: Bates	R, H, 403, LF, MIL
TX0341	GOOG-SING-00083477	GOOG-SING-00083478	February 2, 2011 Email from Teller to Taylor re: Nda	R, H, 403, LF, MIL
TX0342	GOOG-SING-00083479	GOOG-SING-00083481	February 10, 2011 Email from Taylor to Shoji, Bontia cc: Teller et al Subject: FPU NDA (WAS: Fwd: Nda) enclosing attachment: "MNDA Google-Singular 26Jan2011.doc"	R, H, 403, LF, MIL
TX0343	GOOG-SING-00083490	GOOG-SING-00083490	February 23, 2011 Email from Teller to Baluja re: computer vision contact for joe bates machine discussion	R, H, 403, LF, MIL
TX0344	GOOG-SING-00083491	GOOG-SING-00083493	February 24, 2011 Email chain from A. Teller to S. Ioffe re: ref: Shumeet Baluja	R, H, 403, LF, MIL
TX0345	GOOG-SING-00083494	GOOG-SING-00083495	February 27, 2011 Email chain from A. Ng to A. Teller re: Just curious	R, H, 403, LF, MIL
TX0346	GOOG-SING-00083496	GOOG-SING-00083499	March 6, 2011 Email chain from A. Teller to S. Thrun Re: Tom Dean (GoogleX, "physically realistic" computing, guidance on image search problem)	R, H, 403, LF, MIL
TX0347	GOOG-SING-00083506	GOOG-SING-00083511	March 8, 2017 Email from Teller to Piponi re: Fwd: Tom Dean (GoogleX, "physically realistic" computing, guidance on image search problem)	R, H, 403, LF, MIL
TX0348	GOOG-SING-00083512	GOOG-SING-00083515	March 8, 2011 Email from Teller to Piponi re: Fwd: practical image matching task	R, H, 403, LF, MIL
TX0349	GOOG-SING-00083516	GOOG-SING-00083517	March 21, 2011 Email from Teller to Piponi re: Fwd: IP issues resolved?	R, H, 403, LF, MIL
TX0350	GOOG-SING-00083518	GOOG-SING-00083518	March 22, 2011 Email from Teller to Thrun re: Follow up about Navia - probalistic computing	R, H, 403, LF, MIL
TX0351	GOOG-SING-00083519	GOOG-SING-00083529	March 25, 2011 Email from Teller to Thrun re: Navia meetings at Google: Monday 3/21 at 12:00 Mountain View	R, H, 403, LF, MIL
TX0352	GOOG-SING-00083530	GOOG-SING-00083531	March 30, 2011 Email from Teller to Piponi re: transient bump in the road	R, H, 403, LF, MIL
TX0353	GOOG-SING-00083532	GOOG-SING-00083533	April 14, 2011 Email chain from A. Teller to J. Lee re: image processing for low-prevision FPUs?	R, H, 403, LF, MIL
TX0354	GOOG-SING-00083534	GOOG-SING-00083535	May 5, 2011 Email from Teller to Heileson re: Fwd: approach to pass by Google legal	R, H, 403, LF, MIL
TX0355	GOOG-SING-00083536	GOOG-SING-00083538	May 29, 2011 Email from Teller to Bates re: FYI	R, H, 403, LF, MIL
TX0356	GOOG-SING-00083539	GOOG-SING-00083539	June 14, 2011 Email from Google Calendar to Piponi re: Working session with Joe Bates	R, H, 403, LF, MIL

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TX0357	GOOG-SING-00083540	GOOG-SING-00083540	June 14, 2011 Email from Google Calendar to Teller re: Working session with Joe Bates	R, H, 403, LF, MIL
TX0358	GOOG-SING-00083541	GOOG-SING-00083541	June 22, 2011 Google Calendar Invite to Jae Jung, Johnny Chen, Dan Piponi, Subject: Working session with Joe Bates, for June 24, 2011	R, H, 403, LF, MIL
TX0359	GOOG-SING-00083542	GOOG-SING-00083564	June 22, 2011 Email string from A. Teller to D. Piponi, et al., Subject: Fwd: Applications, markets deal questions, enclosing Singular June 2011 Presentation slides "Applications / Markets / And Deals" by J. Bates	R, H, 403, LF, MIL
TX0360	GOOG-SING-00083565	GOOG-SING-00083566	June 22, 2011 Email string from A. Teller to J. Chen, Subject: Invitation: Working session with Joe Bates	R, H, 403, LF, MIL
TX0361	GOOG-SING-00083567	GOOG-SING-00083590	June 22, 2011 Email string from J. Chen to L. Barroso, Subject: Hello -- questions about SIMD architecture, enclosing Singular June 2011 Presentation slides "Applications / Markets / And Deals" by J. Bates	R, H, 403, LF, MIL
TX0362	GOOG-SING-00083591	GOOG-SING-00083593	June 23, 2011 Email from Chen to Barroso cc Teller re: hello - question about SIMD architecture	MIL
TX0363	GOOG-SING-00083594	GOOG-SING-00083617	June 23, 2011 Email string from J. Chen to V. Vanhoucke, Subject: Help with SIMD experts, enclosing Singular June 2011 Presentation "Applications / Markets / And Deals" by J. Bates	R, H, 403, LF, MIL
TX0364	GOOG-SING-00083618	GOOG-SING-00083642	June 23, 2011 Email string from J. Chen to S. LeGrand, cc to A. Teller re: Help with SIMD experts, enclosing June 2011 Singular Presentation slides "Applications/Markets/and Deals" by Bates	R, H, 403, LF, MIL
TX0365	GOOG-SING-00083643	GOOG-SING-00083645	June 23, 2011 Email from Teller to Chen re: Help with SIMD experts	R, H, 403, LF, MIL
TX0366	GOOG-SING-00083646	GOOG-SING-00083646	June 23, 2011 Calendar Invite from A. Teller for June 24, 2011 to D. Piponi, J. Chen, J. Jung, T. Dean, D. Lyon re: working session with Joe Bates	R, H, 403, LF, MIL
TX0367	GOOG-SING-00083647	GOOG-SING-00083649	June 23, 2011 Email from T. Dean to A. Teller cc Chen re: Help with SIMD experts	R, H, 403, LF, MIL
TX0369	GOOG-SING-00083654	GOOG-SING-00083656	June 24, 2011 Email from Massimino to Chen cc Backer et al Re: Help with SIMD experts	R, H, 403, LF, MIL
TX0370	GOOG-SING-00083657	GOOG-SING-00083658	June 27, 2011 Email chain from A. Teller to S. Le Grand cc: J. Chen, D. Piponi, J. Jung, D. Lyon, T. Dean re: Invitation: working session with Joe Bates @ Fri Jun 24 9:30am-12:50pm	R, H, 403, LF, MIL
TX0371	GOOG-SING-00083659	GOOG-SING-00083660	June 28, 2011 Email from A. Teller to J. Chen Fwd: Help with SIMD experts	R, H, 403, LF, MIL
TX0372	GOOG-SING-00083661	GOOG-SING-00083662	June 28 and June 24, 2011 Singular Project Log notes	R, H, 403, LF, MIL
TX0373	GOOG-SING-00083663	GOOG-SING-00083663	June 29, 2011 Email from Le Grand to Piponi re: Singular Project eval	R, H, 403, LF, MIL
TX0374	GOOG-SING-00083664	GOOG-SING-00083664	June 29, 2011 Email from Emile Danna to Bruno De Backer et al. Re: Singular project eval	R, H, 403, LF, MIL

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0375	GOOG-SING-00083665	GOOG-SING-00083667	June 29, 2011 Email from Chen to Teller re: Meeting with OR folks tomorrow morning	R, H, 403, LF, MIL
TX0376	GOOG-SING-00083668	GOOG-SING-00083668	June 30, 2011 Email from De Backer to Piponi re: Singular project eval	R, H, 403, LF, MIL
TX0377	GOOG-SING-00083671	GOOG-SING-00083673	July 7, 2011 Email from Le Grand to Chen re: Question about computer architecture evaluation	MIL
TX0378	GOOG-SING-00083676	GOOG-SING-00083677	July 13, 2011 Email from Teller to Treuille re: feedback on conversation with Jo (sic) Bates	MIL
TX0379	GOOG-SING-00083865	GOOG-SING-00083565	February 3, 2017 Email from Teller to Tammo re: Thanks	
TX0381	GOOG-SING-00083890	GOOG-SING-00083893	November 27, 2017 Email from Tweddell to Riley re: X advisor session; Positron	R, H, 403, LF, MIL, PK
TX0382	GOOG-SING-00084896	GOOG-SING-00085091	August 21, 2017 Presentation slides "Moneyball 2017 - diligence and valuation"	R, H, 403, LF, MIL, PK, 702
TX0383	GOOG-SING-00085177	GOOG-SING-00085179	June 27, 2011 Document "Bates Chip Analysis" by S. Le Grand	R, H, 403, LF, MIL, C, 702, 703, 704
TX0384	GOOG-SING-00087144	GOOG-SING-00087152	December 8, 2014 Presentation slides "The Jellyfish Opportunity" by N. Jouppi	R, H, 403, LF, MIL
TX0385	GOOG-SING-00088124	GOOG-SING-00088222	April 14, 2016 Presentation slides "PIE Design Review: Performance Optimization for TensorFlow"	R, H, 403, LF, MIL, PK
TX0386	GOOG-SING-00089934	GOOG-SING-90029	October 5, 2017 Presentation slides "Building Intelligent Systems with Large Scale Deep Learning," Jeff Dean talk at Rice	R; H; LF; MIL; 403
TX0387	GOOG-SING-00090030	GOOG-SING-00090074	October 10, 2017 Presentation slides "In-Data Center Performance Analysis of a Tensor Processing Unit" by N. Jouppi, C. Young, et al	R, H, 403, LF, MIL, PK
TX0388	GOOG-SING-00090309	GOOG-SING-00090315	October 31, 2017 Document/notes "Norm/Jim 1:1 Minutes"	R, H, 403, LF, MIL
TX0389	GOOG-SING-00091188	GOOG-SING-00091188	Excel Spreadsheet "ML accelerator roadmap" (native Excel) (2015-2020)	R, H, 403, LF, MIL, PK
TX0392	GOOG-SING-00101476	GOOG-SING-00101531	BarnaCore Micro-architecture Specification, updated May 5, 2015	R, H, 403, LF, MIL, PK
TX0393	GOOG-SING-00101556	GOOG-SING-00101869	January 8, 2016 Presentation slides "Workshop on Platforms for Machine Learning" organizers G. Kurian, R. Hundt, R. Govindaraju	R, H, 403, LF, MIL, PK, LP
TX0394	GOOG-SING-00101938	GOOG-SING-00101978	April 12, 2016 Presentation slides "Jellyfish for DeepMind"	R, H, 403, LF, MIL, PK
TX0395	GOOG-SING-00102287	GOOG-SING-00102294	Article "A Domain-Specific Supercomputer for Training Deep Neural Networks" by N. Jouppi, et al	R, H, 403, LF, MIL, PK
TX0396	GOOG-SING-00106167	GOOG-SING-00106172	September 2019 Document "TPUs' energy problem (and what we can do about it)"	R, H, 403, LF, MIL, PK
TX0397	GOOG-SING-00106871	GOOG-SING-00106931	October 3, 2019 Presentation slides "Domain Specific Architectures for Deep Neural Networks: Three Generations of Tensor Processing Units (TPUs)" David Patterson for Google Brain at UC Berkeley	R, H, 403, LF, MIL
TX0398	GOOG-SING-00109778	GOOG-SING-00109932	December 13, 2018 Presentation "Platforms Performance Update for Google Brain"	R, H, 403, LF, MIL, PK
TX0399	GOOG-SING-00111295	GOOG-SING-00111327	Article "Cloud TPU Architecture Recommendation"	R, H, 403, LF, MIL, PK

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TX0400	GOOG-SING-00111560	GOOG-SING-00111652	March 2, 2017 Notes entitled discussion with Joe Bates	
TX0401	GOOG-SING-00112174	GOOG-SING-00112208	November 8, 2019 ML Update & 2020 Investments	R, H, 403, LF, MIL, PK
TX0402	GOOG-SING-00112291.R	GOOG-SING-00112319.003.R	"Platforms for Machine Learning - v2 Current Perf/TCO & Competitive Analysis to inform Strategic Vision" updated August 2020	R, H, 403, LF, MIL, PK
TX0403	GOOG-SING-00113108	GOOG-SING-00113110	July 30, 2011 Email string from A. Ng to J. Dean forwarding July 12 email string between J. Bates and A. Ng re "Quick question"	R, H, 403, LF, MIL, PK, 701, 702
TX0404	GOOG-SING-00113187	GOOG-SING-00113188	September 24, 2013 Email string from Eric Holck to Jeff Dean re: Good to meet you	R, H, 403, LF, MIL, PK, P
TX0405	GOOG-SING-00113210	GOOG-SING-00113210	November 18, 2013 Email from Jeff Dean to PDB Snippets re Snippet	R, H, 403, LF, MIL, PK
TX0406	GOOG-SING-00113712	GOOG-SING-00113720	August 18, 2016 Email string from Zak Stone to Jeff Dean Re: TPU in the cloud	R, H, 403, LF, MIL, PK
TX0407	GOOG-SING-00114362	GOOG-SING-00114401	Presentation "Intelligence on Tap: Making Humans Better Through Machine Learning" Jeff Dean (Copy of TedX LA Machine Learning talk)	R, H, 403, LF, MIL, PK
TX0408	GOOG-SING-00119382	GOOG-SING-00119387	October 13, 2017 Email chain from E. Elsen to B. Jacob cc: Norm Jouppi, David Patterson, Zak Stone, Cliff Young et al re: [brain-papers] Mixed Precision Training	R, H, 403, LF, MIL, PK
TX0409	GOOG-SING-00119398	GOOG-SING-00119402	October 16, 2017 Email string from Bjarke Roune to Rajat Monga et al. Re: [brain-papers] Mixed Precision Training	R, H, 403, LF, MIL, PK
TX0411	GOOG-SING-00125865	GOOG-SING-00212957	May 2018 Presentation slides "TGIF - Cloud TPUs"	R, H, 403, LF, MIL, PK
TX0412	GOOG-SING-00127216	GOOG-SING-00127306	June 2018 Presentation Slides "eBay TPU Discussion"	R, H, 403, LF, MIL, PK
TX0413	GOOG-SING-00127863	GOOG-SING-00127872	2018 Transcript of Interview of Jeff Dean by Martin Ford "Jeffrey Dean, Google Senior Fellow, Head of AI and Google Brain"	R, H, 403, LF, MIL, PK, C,
TX0414	GOOG-SING-00130218	GOOG-SING-00130274	August 31, 2018 Article "AIC Kick-off Meeting"	R, H, 403, LF, MIL, PK
TX0415	GOOG-SING-00133465	GOOG-SING-00133479	July 25, 2019 Presentation slides "Google Research"	R, H, 403, LF, MIL, PK
TX0416	GOOG-SING-00134507	GOOG-SING-00134523	2020 Paper "The Deep Learning Revolution and Its Implications for Computer Architecture and Chip Design" Jeff Dean (ISSCC 2020 Keynote paper)	R, H, 403, LF, MIL, PK
TX0419	GOOG-SING-00141512	GOOG-SING-00141518	May 24, 2017 "Volta Perf/TCO Update"	R, H, 403, LF, MIL, PK
TX0420	GOOG-SING-00141713	GOOG-SING00141776	September 29, 2015 Presentation slides "Jellyfish Barnacore Analysis Platforms Performance Team Meeting"	R, H, 403, LF, MIL, PK
TX0422	GOOG-SING-00144409	GOOG-SING-00144425	March 14, 2019 Presentation slides "Accelerator OSR: Fleetwide oversubscription ratio (OSR) policy for accelerators"	R, H, 403, LF, MIL, PK
TX0423	GOOG-SING-00144523	GOOG-SING-00144590	March 27, 2019 Presentation slides "Domain-Specific Architectures for Deep Neural Networks" by David Patterson, Google Al and UC Berkeley	R, H, 403, LF, MIL
TX0426	GOOG-SING-00145184	GOOG-SING-00145214	April 26, 2019 Presentation slides "ML Demand Forecast - Weekly Checkpoint"	R, H, 403, LF, MIL, PK
TX0427	GOOG-SING-00147015	GOOG-SING-00147082	October 15, 2019 Presentation slides "Google: ML Long Term Investment - AIC"	R, H, 403, LF, MIL, PK

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TX0428	GOOG-SING-00147965	GOOG-SING-00147987	November 21, 2019 Presentation slides "SysInfra Review: AdBrain ROI (2019)"	R, H, 403, LF, MIL, PK
TX0429	GOOG-SING-00148138	GOOG-SING-00148152	January 31, 2019 Document "2020 TPU Request for Search Quality" updated August 30, 2019	R, H, 403, LF, MIL, PK
TX0430	GOOG-SING-00148153	GOOG-SING-00148153	December 20, 2019 Spreadsheet "Copy of ML Demand Plan (WIP)" N. Patil	R, H, 403, LF, MIL, PK, 1006
TX0431	GOOG-SING-00148375	GOOG-SING-00148572	Google Platforms - Noogler Training	R, H, 403, LF, MIL, PK; 703, 704
TX0434	GOOG-SING-00150063	GOOG-SING-00150154	Presentation Slides "Platforms University Training - Accelerators" by Maire (and many contributors), last updated Q4 2017	R, H, 403, LF, MIL, PK
TX0435	GOOG-SING-00150918	GOOG-SING-00150921	November 29, 2018 Document "Methodology for tracking ML competitive landscape" mjeong@	R, H, 403, LF, MIL, PK
TX0436	GOOG-SING-00152127	GOOG-SING-00152129	January 23, 2014 Email string from N. Boden to J. Dean, cc to L. Barroso, N. Jouppi, G. MacKean re: Fwd: Good to meet you	R, H, 403, LF, MIL, PK, C
TX0438	GOOG-SING-00152744	GOOG-SING-00152749	August 18, 2014 Email string from Norm Jouppi to Olivier Temam re: Sync with James	R, H, 403, LF, MIL, PK
TX0439	GOOG-SING-00158554	GOOG-SING-00158579	January 28, 2016 Future Platforms	R, H, 403, LF, MIL, PK
TX0440	GOOG-SING-00160295	GOOG-SING-00160339	August 25, 2016 Presentation "GCD QBR- Q2'16"	R, LF, H, 403, 703, MIL, PK
TX0441	GOOG-SING-00162170	GOOG-SING-00162193	January 30, 2017 Google: ML Accelerators @ Alphabet sano@	R, LF, H, 403, 703, MIL, PK
TX0442	GOOG-SING-00162668	GOOG-SING-00162699	Article "Extended Cross Lane Unit Microarchitecture Specification"	R, LF, H, 403, PK
TX0443	GOOG-SING-00164482	GOOG-SING-00164512	May 12, 2017 Email string from jellyfish-sw@google.com to Digest recipients [jellyfish-sw@google.com] Re: [jellyfish-sw] Digest for jellyfish-sw@google.com - 25 updates in 8 topics	R, LF, H, 403, MIL, PK
TX0444	GOOG-SING-00166940	GOOG-SING-00166968	ML Datacenter Developments 2017	R, LF, H, 403, MIL, PK
TX0445	GOOG-SING-00168191	GOOG-SING-00168193	August 18, 2017 Document "Why Invest More Now"	R, LF, H, 403, MIL, PK
TX0446	GOOG-SING-00169163	GOOG-SING-00169196	Long-term Platform Roadmap 2017	R, LF, H, 403, 703
TX0447	GOOG-SING-00169325	GOOG-SING-00169346	Undated Presentation slides "Jellyfish Strategic Impact & Competitive Analysis" by N. Patil, N. Jouppi	R, LF, H, 403, MIL, PK
TX0448	GOOG-SING-00169749	GOOG-SING-00169763	Spring 2017 Presentation slides "ML Datacenter Roadshow" jouppi@	R, LF, H, 403, MIL, PK
TX0449	GOOG-SING-00170138	GOOG-SING-00170138	Excel spreadsheet: 2017 Budget Opex/Capex/RE	R, LF, H, 403, 703, MIL, PK
TX0450	GOOG-SING-00170150	GOOG-SING-00170154	November 1, 2017 Email from Stone to Hurt re: Questions about long-term accelerator performance trends	R, LF, H, 403, 703
TX0451	GOOG-SING-00170565	GOOG-SING-00170575	December 17, 2017 Presentation slides "Challenges for Inference-only Datacenter Accelerators"	R, LF, H, 403, 703
TX0452	GOOG-SING-00171751	GOOG-SING-00171779	March 2, 2018 Presentation slides "Platforms for Machine Learning 2018 - Session 1: ML Accelerator Roadmap" by Norm Jouppi	R, LF, H, 403, 703
TX0453	GOOG-SING-00172405	GOOG-SING-00172427	Presentation slides "Challenges for Inference-only Datacenter Accelerators," updated February 22, 2018	R, LF, H, 403, 703
TX0454	GOOG-SING-00176830	GOOG-SING-00176864	May 9, 2018 ML Models w/ Bfloat16	R, LF, H, 403, 703

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TX0455	GOOG-SING-00178314	GOOG-SING-00178569	Undated Presentation slides "Accelerated Machine Learning in the Cloud: GPUs Cloud TPUs, and More" by John Barrus, Zak Stone	R, LF, H, 403, 703
TX0456	GOOG-SING-00181342	GOOG-SING-00181342	Excel Spreadsheet "[DEPRECATED] accelerator sys restricted" (last modified 8/29/18) (native Excel)	R, LF, H, 403, 703
TX0457	GOOG-SING-00185225	GOOG-SING-00185267	Accelerate ML Training at Google Scale to enable TPUs in the Cloud (TPUs in Cloud Summary (go/tpus-in-cloud-summary)) (Updates October 18, 2018)	R, LF, H, 403, 703
TX0458	GOOG-SING-00187461	GOOG-SING-00187480	November 13, 2018 New Hardware Platforms	R, LF, H, 403, 703
TX0459	GOOG-SING-00188160	GOOG-SING-00188167	September 2017 Document "Deployment-Oriented Metrics for Post-Moore's Law Datacenters" by David Patterson	R, LF, H, 403, 703
TX0460	GOOG-SING-00189284	GOOG-SING-00189298	October 1, 2017 What might datacenters look like in 2030? by dweekly@	R, LF, H, 403, 703
TX0461	GOOG-SING-00189669	GOOG-SING-00189774	December 14, 2018 "Platforms Infrastructure Engineering Monthly All Hands Meeting"	R, LF, H, 403, 703
TX0462	GOOG-SING-00190403	GOOG-SING-00190476	November 2, 2018 Presentation slides "Managing Compute at Google Scale" UC Berkeley RISE Lab Seminar	R, LF, H, 403, 703
TX0463	GOOG-SING-00191725	GOOG-SING-00191726	March 10, 2019 Email from C. Young to J. Hennessy re performance comparison	R, LF, H, A, 403, 703
TX0464	GOOG-SING-00191984	GOOG-SING-00192006	March 8, 2018 Document "Tensorflow Mixed Precision API"	R, LF, H, A, 403, 703
TX0466	GOOG-SING-00193627	GOOG-SING-00193632	"ML accelerator evaluation: CPU, GPU, and TPU" last updated August 22, 2018	R, LF, H, 403, 703
TX0467	GOOG-SING-00196404	GOOG-SING-00196411	August 22, 2019 Draft blog post, BF16 Blog Post for Cloud TPU	LF, H, 403, 703
TX0468	GOOG-SING-00197183	GOOG-SING-00197227	August 2019 Presentation slides "MLDC - Update"	R, LF, H, 403, 703
TX0470	GOOG-SING-00199412	GOOG-SING-00199428	Article "The Deep Learning Revolution and Its Implications for Computer Architecture and Chip Design" by J. Dean	R, LF, H, 403, 703
TX0471	GOOG-SING-00201924	GOOG-SING-00202026	November 1, 2019 ML Platforms Strategy	R, LF, H, 403, 703
TX0474	GOOG-SING-00206910	GOOG-SING-00206962	May we have more Moore’s Law please? by Luiz Barroso, Partha Ranganathan	R, LF, H, 403, 703
TX0476	GOOG-SING-00207491	GOOG-SING-00207549	Presentation slides "Supercomputer for Machine Learning" Based on "In-Datacenter Performance Analysis of an Architecture Family of Scalable Multiprocessors for Neural Network Training" by Jouppi, et al.	R, LF, H, 403, 703
TX0477	GOOG-SING-00208998	GOOG-SING-00208999	January 7, 2017 Email chain from A. Teller to O. Felten, I. Stivoric, T. Spalink re: West Coast in February	R, LF, H, 403, MIL
TX0478	GOOG-SING-00209004	GOOG-SING-00209007	January 15, 2017 Email string from T. Spalink to O. Felten, cc: I. Stivoric, A. Teller re: West Coast in February	R, LF, H, 403, MIL
TX0479	GOOG-SING-00209008	GOOG-SING-00209008	January 24, 2017 Email from Sexauer to Leichner re: [X TECH TALK] Approximate Computing, Embedded AI, and Billion Core Systems	R, LF, H, 403, MIL
TX0480	GOOG-SING-00209010	GOOG-SING-00209011	February 2, 2017 Email from Google Calendar (on behalf of N. Sexauer) to Xteam re Bates' X TECH TALK Approximate Computing, Embedded AI and Billion Core Systems	R, LF, H, 403, MIL

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TX0481	GOOG-SING-00209012	GOOG-SING-00209012	February 3, 2017 Google Calendar to T. Spalink, J. Wall, C. Tornabene re Singular Computing/X Discussion scheduled for February 6, 2017	R, LF, H, 403, MIL
TX0482	GOOG-SING-00209015	GOOG-SING-00209016	February 3, 2017 Email string from N. Sexauer to P. Felten re: Singular Computing/X	R, LF, H, 403, MIL, P
TX0483	GOOG-SING-00209016	GOOG-SING-00209016	February 3, 2017 Portion of Email string from T. Spalink to O. Felten re: Singular Computing/X	R, LF, H, 403, MIL, P, 106
TX0484	GOOG-SING-00209017	GOOG-SING-00209020	February 8, 2017 Email string from O. Felten to T. Spalink re: Singular Computing/X	LF, H, 403
TX0485	GOOG-SING-00209021	GOOG-SING-00209021	February 8, 2017 Email string from O. Felten to A. Teller re: Obi Astro 21 list	R, LF, H, 403, MIL
TX0486	GOOG-SING-00209022	GOOG-SING-00209022	February 9, 2017 Email from Google Calendar to J. Bates re scheduling conference call between O. Felten and J. Bates	R, LF, H, 403, MIL
TX0487	GOOG-SING-00209023	GOOG-SING-00209028	February 13, 2017 Email string from O. Felten to C. Tornabene re: Singular Computing due diligence	R, LF, H, 403, MIL, P
TX0488	GOOG-SING-00209035	GOOG-SING-00209040	February 22, 2017 Email from O. Felten to T. Spalink re: next steps w/Jim Laudon	R, LF, H, 403, MIL, P
TX0489	GOOG-SING-00209046	GOOG-SING-00209052	February 28, 2017 Email string from J. Wall to A. Patel cc: Felten, et al. re: Singular Computing due diligence	R, LF, H, 403, MIL, P
TX0490	GOOG-SING-00209053	GOOG-SING-00209061	March 1, 2017 Email string from Patel to J. Wall cc: C. Tornabene re: Singular Computing due diligence showing Attachment: SingularComputingMANDA20170301.docx	R, LF, H, 403, MIL, P
TX0491	GOOG-SING-00212471	GOOG-SING-00212519	June 18, 2018 Accelerating ML Research with TPUs	R, LF, H, 403, 703
TX0492	GOOG-SING-00212536	GOOG-SING-00212541	Document "FFDS Methodology" (Fastest Fish in the Deep Sea)	R, LF, H, 403, 703
TX0493	GOOG-SING-00213649	GOOG-SING-00213672	May 23, 2018 Google: RMI OSR Pilot: PowerPacking	R, LF, H, 403, 703
TX0494	GOOG-SING-00214302	GOOG-SING-00214337	September 17, 2018 TPU Pitch Alphabet Customers	R, LF, H, 403, 703
TX0495	GOOG-SING-00216427	GOOG-SING-00216463	Presentation slides "TPUs for Developers"	R, LF, H, 403, 703
TX0496	GOOG-SING-00216966	GOOG-SING-00217043	March 20, 2019 Presentation slides "MLII Summit Product Keynote - ML Infrastructure & Production Summit" by pbrandt@, wesw@	R, LF, H, 403, 703
TX0497	GOOG-SING-00217749	GOOG-SING-00217806	August 31, 2018 Presentation slices "AIC Kick-off Meeting"	R, LF, H, 403, 703
TX0498	GOOG-SING-00220024	GOOG-SING-00220028	"Pufferfish BarnaCore Host Software Postmortem" updated May 29, 2019	R, LF, H, 403, 703
TX0499	GOOG-SING-00220082	GOOG-SING-00220091	Communications of the ACM Article, "A Domain-Specific Supercomputer for Training Deep Neural Networks" by Norm Jouppi, et al	R, LF, H, 403, 703
TX0500	GOOG-SING-00220102	GOOG-SING-00220152	Google page - Proposed Economic Impact Frameworks to Measure ML Value Creation - August 2019	R, LF, H, 403, 703
TX0501	GOOG-SING-00220545	GOOG-SING-00220553	September 27, 2019 Email from Y. Chen to D. Morris re Examples of General Scientific Computing on TPUs	R, LF, H, 403, 703
TX0502	GOOG-SING-00220554	GOOG-SING-00220584	November 10, 2017 Fixing "End-of-Moore's Law"	R, LF, H, 403, 703
TX0503	GOOG-SING-00220902	GOOG-SING-00220909	February 14, 2019 "TPUs Just Work"	R, LF, H, 403, 703

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TX0504	GOOG-SING-00220910	GOOG-SING-00220924	July 23, 2019 Presentation "Keras + TPUs"	R, LF, H, 403, 703
TX0506	GOOG-SING-00230962	GOOG-SING-00230975	Article "Co-Design of a Tensor Processing Unit for Neural Network" (Google Internal Version - ASPLOS Submission #205 - Confidential Draft)	R, LF, H, 403, 703
TX0507	GOOG-SING-00232213	GOOG-SING-00232262	January 28, 2019 Presentation "TPU Users Survey 2019-Q1"	R, LF, H, 403, 703
TX0508	GOOG-SING-00233714	GOOG-SING-00233772	November 6, 2019 Neural Networks Have Rebooted Computer Architecture What Should We Reboot Next?	R, LF, H, 403, 703
TX0509	GOOG-SING-00235697	GOOG-SING-00235701	May 5, 2020 Document "Towards Measuring the Return on the Investment in ML 2020-Q2" Authors: nishantpatil, davidpatterson	R, LF, H, 403, 703
TX0510	GOOG-SING-00235767	GOOG-SING-00235798	August 6, 2013 Presentation "Accelerators@Google - GPUs and Beyond - Systems Infrastructure Review 8/6/13"	R, LF, H, 403, 703
TX0515	GOOG-SING-00235914	GOOG-SING-00235934	October 25, 2018, Presentation slides "PcX MXU Design Review"	R, LF, H, 403, 703
TX0518	GOOG-SING-00236034	GOOG-SING-00236047	2021 ACM/IEEE Article "Ten Lessons From Three Generations Shaped Google's TPUv4i" Norm Jouppi, et al	R, LF, H, 403, 703
TX0519	GOOG-SING-00236088	GOOG-SING-00236097	Presentation slides "PFC TensorCore Sequencer uArch Spec: Diagrams" (companion set of slides to the Core Sequencer uArch Spec Google Doc)	R, LF, H, 403, 703
TX0521	GOOG-SING-00236187	GOOG-SING-00236191	May 20, 2020 Document "Towards Measuring the Return on the Investment in ML 2020-Q2" by N. Patil, D. Patterson, created May 5, 2020	R, LF, H, 403, 703
TX0522	GOOG-SING-00236226	GOOG-SING-00236226	Excel Spreadsheet "Precog AdBrain Launch Stats" (TPU chip quantities) (native Excel)	H, LF, R, 403
TX0523	GOOG-SING-00236249	GOOG-SING-00236251	May 1, 2020 Document "Rationale for New Domain Specific Architecture Systems" by N. Patil, D. Patterson	R, LF, H, 403, 703
TX0525	GOOG-SING-00236336	GOOG-SING-00236337	May 20, 2020 Document "What if Google Deployed V100s Instead of Dragonfish? 2020-Q2" by N. Patil, D. Patterson	LF, 403
TX0527	GOOG-SING-00236721	GOOG-SING-00236749	April 19, 2019 Grappler TensorFlow Simulator (tf-sim)	R, LF, H, 403, 703
TX0529	GOOG-SING-00236802	GOOG-SING-00236869	March 17, 2015 Google: Jellyfish Platforms Cross Functional Review	R, LF, H, 403, 703
TX0530	GOOG-SING-00236880	GOOG-SING-00236887	January 17, 2019 ML inference roadmap Author: alexramirez, Contributors: nishantpatil, govindaraju, Jouppi	R, LF, H, 403, PK
TX0531	GOOG-SING-00237005	GOOG-SING-00237010	May 1, 2015 Performance Portable Programming	R, LF, H, 403, PK
TX0532	GOOG-SING-00237338	GOOG-SING-00237347	July 1, 2020 Webpage: A Domain-Specific Supercomputer for Training Deep Neural Networks	A, R, LF, 403, H
TX0533	GOOG-SING-00237356	GOOG-SING-00237366	Webpage: How Many Data Centers Needed World-Wide	R, LF, H, A, 403, PK, 703
TX0534	GOOG-SING-00237367	GOOG-SING-00237368	"NVIDIA Tesla V100 GPU Accelerator" (July 2017)	R, H, LF, 403, 703, PK
TX0536	GOOG-SING-00237462	GOOG-SING-00237506	NVIDIA Tesla P100 - The Most Advanced Datacenter Accelerator Ever Built (2016)	R, H, LF, 403, 703, PK
TX0537	GOOG-SING-00237897	GOOG-SING-00237933	AIC - Feb 1, 2019 Alphabet inference roadmap discussion	R, H, LF, 403, 703, PK, MIL
TX0538	GOOG-SING-00238156	GOOG-SING-00238208	August 3, 2017 Presentation slides "Mot-Volta Dev Entry"	R, H, LF, 403, 703, PK, MIL
TX0539	GOOG-SING-00238532	GOOG-SING-00238535	July 27, 2016 Jellyfish/JellyDonut Manufacturing Supply Chain	R, H, LF, 403, 703, PK, MIL

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0540	GOOG-SING-00238670	GOOG-SING-00238670	Excel Spreadsheet: JF Rack Cost ($M)	R, H, LF, 403, 703, PK, MIL
TX0541	GOOG-SING-00238734	GOOG-SING-00238734	Excel Spreadsheet "ML accelerator roadmap" (Seastar, JF, DF comparisons - TCO$ - Power) (native Excel)	R, H, LF, 403, 703, PK, MIL
TX0542	GOOG-SING-00238771	GOOG-SING-00238823	April 27, 2018 Google: MonsterTruck Volta GA Ramp Entrance Review	R, H, LF, 403, 703, PK, MIL
TX0544	GOOG-SING-00239112	GOOG-SING-00239114	May 1, 2020 Document "Rationale for New Domain Specific Architecture Systems" N. Shafiei, D. Patterson	R, H, LF, 403, 703, PK, MIL
TX0545	GOOG-SING-00239134	GOOG-SING-00239189	March 6, 2020 SearchAds Wider Models on SeaStar and PuffyLite Enablement	MIL; R; H; LF; 403; 703
TX0546	GOOG-SING-00239232	GOOG-SING-00239387	March 19, 2015 System Architectures for AdBrain	MIL; R; H; LF; 403; 703
TX0547	GOOG-SING-00239440	GOOG-SING-00239508	January 10, 2018 Presentation slides "The Case for 10X More ML Capacity - Interactive ML supercomputers for everyone" Speaker clattner	MIL; R; H; LF; 403; 703; PK
TX0548	GOOG-SING-00239510	GOOG-SING-00239559	TPU and GPU Comparison for ML Training Contacts: nishantpatil, mjeong, dyoon, Inai Accelerator Architecture and Performance Team	MIL; R; H; LF; 403; 703; PK
TX0549	GOOG-SING-00239702	GOOG-SING-00239704	Restricted Accelerator TCO-PY3	MIL; R; H; LF; 403; 703; PK
TX0550	GOOG-SING-00239972	GOOG-SING-00239994	April 5, 2021 Document "Ads Approved Financial Review of Specific TPU HW Enabled AdBrain Launches" last updated April 14, 2021	MIL; R; H; LF; 403; 703; PK
TX0551	GOOG-SING-00240045	GOOG-SING-00240045	Spreadsheet "ML cost and revenue"	MIL; R; H; LF; 403; 703
TX0552	GOOG-SING-00240274	GOOG-SING-00240295	Undated Presentation slides "Jellyfish Numerics"	R; H; LF; 403; 703
TX0553	GOOG-SING-00240368	GOOG-SING-00240397	Q1 2021 Finance Validation for ML Long-term Forecast	MIL; R; H; LF; 403; 703
TX0555	GOOG-SING-00240492	GOOG-SING-00240515	2021 'Google AI: TPU Trajectory	MIL; R; H; LF; 403; 703; PK
TX0556	GOOG-SING-00240516	GOOG-SING-00240536	May 26, 2021 Presentation slides "VxC All Hands" N. Jouppi	MIL; R; H; 403; 703
TX0558	GOOG-SING-00240579	GOOG-SING-00240580	Google Document "approximate computing, embedded ai, billion core systems - joe bates - singular computing - cambridge"	MIL; R; H; LF; 403; 703
TX0560	GOOG-SING-00240929	GOOG-SING-00240971	Undated Document "Introduction to Tensor Processing Units (TPUs)"	MIL; R; H; LF; 403; 703; PK
TX0561	GOOG-SING-00241219	GOOG-SING-00241219	Spreadsheet "TCO of TPUs and GPUs"	MIL; R; H; LF; 403; 703; PK
TX0566	GOOG-SING-00241486	GOOG-SING-00241491	2016 Presentation slides "Overall Package BOM Qualification Plan"	R; H; LF; 403; 703
TX0572	GOOG-SING-00241513	GOOG-SING-00241513	2018-2021 Data Center Capex/Opex (2018-2021)	R; H; LF; 403; 703
TX0573	GOOG-SING-00241522	GOOG-SING-00241522	2018-2019 Excel Spreadsheet: Projects completed and Costs for Dragonfish, "Retrofit Cost, ML-Hubs (go_ml-hubs)"	R; H; LF; 403; 703
TX0575	GOOG-SING-00242320	GOOG-SING-00242337	September 11, 2013 Email from J. Dean to "sqb-team" "Google-Brain-team" and L. Barroso re Fwd: Invitation: Approximate computing (Joseph Bates) @ Tue Sep 17, 2013 1pm - 2pm (Jeff Dean) enclosing calendar invitation	R, H, 403, LF, MIL
TX0576	GOOG-SING-00242338	GOOG-SING-00242338	July 1, 2011 Email from A. Teller to devaul@google.com re FPU overview Dec2010.pdf (devaul@google.com)	R, H, 403, LF, MIL

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TX0577	GOOG-SING-00242339	GOOG-SING-00242339	May 18, 2011 Email from A. Teller to gosling@google.com re FPU overview Dec2010.pdf (gosling@google.com)	R, H, 403, LF, MIL
TX0578	GOOG-SING-00242340	GOOG-SING-00242340	March 14, 2011 Email from A. Teller to dclemens@google.com re FPU overview Dec2010.pdf (dclemens@google.com)	R, H, 403, LF, MIL
TX0579	GOOG-SING-00242341	GOOG-SING-00242342	February 24, 2011 Email string from A. Teller to A. Patterson re Re: FPU overview Dec2010.pdf (annap@google.com)	R, H, 403, LF, MIL
TX0580	GOOG-SING-00242343	GOOG-SING-00242343	February 14, 2011 Email from A. Teller to johnnylee@google.com re FPU overview Dec2010.pdf (johnnylee@google.com)	R, H, 403, LF, MIL
TX0581	GOOG-SING-00242344	GOOG-SING-00242355	December 2010 Presentation slides "Computing 10,00X More Efficiently - Technology and Applications Overview" by Joseph Bates	MIL; R; H; LF; 403; A, 701, 702, 703
TX0582	GOOG-SING-00242356	GOOG-SING-00242362	September 11, 2013 Email from J. Dean to "Google-Brain-team," L. Barroso, A. Phelps, J. Laudon re Invitation: Approximate computing (Joseph Bates) @ Tue Sep 17, 2013 1pm - 2pm (Jeff Dean)	R, H, 403, LF, MIL
TX0583	GOOG-SING-00242363	GOOG-SING-00242365	September 11, 2013 Email to J. Dean re Delivery Status Notification (Failure)	R, H, 403, LF, MIL
TX0584	GOOG-SING-00242366	GOOG-SING-00242373	September 11, 2013 Email from J. Dean to "sqb-team," "Google-Brain-team," L. Barroso re Fwd: Invitation: Approximate computing (Joseph Bates) @ Tue Sep 17, 2013 1pm - 2pm (Jeff Dean) and enclosing calendar invitation	R, H, 403, LF, MIL
TX0585	GOOG-SING-00242374	GOOG-SING-00242380	September 11, 2013 Email from Q. Le to J. Dean, et al re Invitation: Approximate computing (Joseph Bates) @ Tue Sep 17, 2013 1pm - 2pm (Jeff Dean), and enclosing calendar invitation	R, H, 403, LF, MIL
TX0587	GOOG-SING-00107734	GOOG-SING-00107764	June 21, 2018 Presentation slides "TPU HW Roadmap"	MIL; R; H; LF; 403; 703
TX0589	n/a	n/a	"Amazon EC2 Inf1 Instances" AWS, accessed at https://aws.amazon.com/ec2/instance-types/inf1/	R; LF; H; A; 403; 703
TX0590	n/a	n/a	"Flip-flop" Britannica, accessed at: https://www.britannica.com/technology/computer-memory#ref93695	R; LF; H; A; 403; 703
TX0591	n/a	n/a	"Google AI with Jeff Dean: GCPPodcast 146" YouTube, uploaded by Google Cloud Tech on September 20, 2018, from 12:48-15:00, accessed at: https://www.youtube.com/watch?v=IwC2XIZ0QJs&ab_channel=GoogleCloudTech;	MIL; R; H; A; C; 403; 703
TX0592	n/a	n/a	"Google Earth Aerial View of Berkeley SC Data Center Building", 2021, https://earth.google.com/web/search/+33%c2%b003%2750.8%22N+80%c2%b002%2736.1%22W/@33.06192015,-80.04448908,13.7007134a,488.94870263d,35y,-Oh,Ot,Or/data=CigiJgokCbHqdqMqbkhAEQIXYn2TbUhAGc_yRizHaQ1AlcSWxdlqTAJA.	A; R; LF, 403, H

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0593	n/a	n/a	"Google Earth Aerial View of Berkeley SC Data Center", Google, January 29, 2021, httpsWearth.google.com/web/search/33%c2%b003%2750.8%22N+80%c2%b002%2736.1%22W/@33.0633414,-80.04194762,15.07138088a,1714.84530851d,35y,14.54231807h,45.00538306t,-Or/data=CigiJgokCITYXiiliEBAERYSO2vhhOBAGeyGuFdpAITAITDZioMiA1TA.	A; R; LF, 403, H
TX0594	n/a	n/a	"Google Earth Aerial View of Council Bluffs IA CBF Data Center", Google, https://earth.google.com/web/search/41%c2%b013%2717.7%22N+95%c2%b051%2749.9%22W/@41.22115026,-95.86447704,297.63431639a,780.52559118d,35y,0.00000001h,44.9960088t,Or/data.CigUgokCZ9yAVAOikBAEW92NBcOhOBAGfEva4MwAVTAIOqW1M6fA1TA.	A; R; LF, 403, H
TX0595	n/a	n/a	"Google Earth Aerial View of Mayes County OK Data Center", Google, https://earth.google.com/web/search/36.241139,-95.330061/@36.23940503,-95.32376715,189.55885797a,1715.51078374d,35y,-55.39186582h,43.26900343t,Or/data=CigilgokCefSZM8d8OFAEaM-VVT228EFAGZMLc7HOYVTAIZt4xivkY1TA.	A; R; LF, 403, H
TX0596	n/a	n/a	"Google Earth Aerial View of The Dalles OR Data Center", Google, July 25, 2021, https:llearth.google.com/web/search/45.632511,-121.2022671@45.63162904,-121.2012341,31.67359741a,638.49544099d,35y,50.63669705h,44.9995316t,360r/data.CigUgokCReM5Cqx0UZAEbL15dy0EZAGSj-E7YRTF7A1Q6wBDueTV7A.	A; R; LF, 403, H
TX0597	n/a	n/a	"Google Maps Aerial View of Berkeley SC Data Center Campus'', 2022, https://www.google.com/maps/@33.0619812,-80.0449447,264m/data=i3m111e3?h1=en.	A; R; LF, 403, H
TX0598	n/a	n/a	"IEEE 754-1985" IEEE.org, accessed at: https://standards.ieee.org/ieee/754/993/. (1985)	
TX0599	n/a	n/a	"IEEE 754-2008" IEEE.org, accessed at: https://standards.ieee.org/ieee/754/4211/.(2008)	
TX0600	n/a	n/a	"IEEE 754-2019" IEEE.org, accessed at: https://standards.ieee.org/ieee/754/6210/. (2019)	
TX0601	n/a	n/a	"IEEE At a Glance" IEEE.org, accessed at: https://www.ieee.org/about/at-a-glance.html?WT.mc_id=ab_lp_qui	

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0602	n/a	n/a	"IEEE754 Format" ASC, accessed at: https://www.rit.edu/academicsuccesscenter/sites/rit.edu.academicsuccesscenter/files/documents/mathhandouts/DM5_IEEE754Format_BP_9_2214.pdf.	
TX0603	n/a	n/a	"Loon" X, accessed at: https://x.company/projects/loon/	A; R; LF, 403, H
TX0604	n/a	n/a	"Midlothian, Texas," Google Data Centers, accessed at: https://www.google.com/about/datacenters/locations/midlothian/	A; R; LF, 403, H
TX0605	n/a	n/a	"Mineral" X, accessed at: https://x.company/projects/mineral/	A; R; LF, 403, H
TX0606	n/a	n/a	"New Albany, Ohio," Google Data Centers, accessed at: https://www.google.com/about/datacenters/locations/new-albany/	A; R; LF, 403, H
TX0607	n/a	n/a	"NVIDIA Data Center GPUs" NVIDIA, accessed at: https://www.nvidia.com/en-us/data-center/data-centergpus/ (2022)	A; R; LF, 403, H
TX0608	n/a	n/a	"NVIDIA DGX A100 System Architecture" NVIDIA, July 2020, p. 4, accessed at: https://images.nvidia.com/aem-dam/en-zz/Solutions/data-center/dgx-a100/dgxa100-system-architecture-whitepaper.pdf	A; R; LF, 403, H
TX0609	n/a	n/a	"NVIDIA Tensor Cores" NVIDIA, accessed at: https://www.nvidia.com/en-us/data-center/tensor-cores/	A; R; LF, 403, H
TX0610	n/a	n/a	"NVIDIA Tesla Overview" NVIDIA accessed at: https://www.nvidia.com/docs/IO/43395/tesla_product_overview.pdf (June 1, 2007)	A; R; LF, 403, H
TX0611	n/a	n/a	"Papillion, Nebraska," Google Data Centers, accessed at: https://www.google.com/about/datacenters/locations/papillion/	A; R; LF, 403, H
TX0612	n/a	n/a	"Processor (CPU)" TechTarget, accessed at: https://www.techtarget.com/whatis/definition/processor	A; R; LF, 403, H
TX0613	n/a	n/a	"Radeon Instinct MI6 Accelerator" AMD, accessed at https://www.amd.com/en/products/professionalgraphics/instinct-mi6	A; R; LF, 403, H
TX0614	n/a	n/a	"Radeon Instinct MI8 Accelerator" AMD, accessed at https://www.amd.com/en/products/professionalgraphics/instinct-mi8	A; R; LF, 403, H
TX0615	n/a	n/a	"Singular Computing LLC (branch)" OpenCorporates Massachusetts, accessed at: https://opencorporates.com/companies/us_ma/001103774	A; R; LF, 403, H
TX0616	n/a	n/a	"Singular Computing" Singular Computing, accessed at: https://www.singularcomputing.com/. (2016)	A, R, LF, H, 403
TX0617	n/a	n/a	"SoC Architecture" MathWorks, accessed at: https://www.mathworks.com/discovery/soc-architecture.html	A; R; LF, 403, H

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0618	n/a	n/a	"Storey County, Nebraska," Google Data Centers, accessed at: https://www.google.com/about/datacenters/locations/storey-county/	A; R; LF, 403, H
TX0619	n/a	n/a	"Table of binary numbers" ConvertBinary, accessed at: https://www.convertbinary.com/numbers/.	A; R; LF, 403, H, 703
TX0620	n/a	n/a	"Tensor Processing Unit" Wikipedia, accessed at: https://en.wikipedia.org/wiki/Tensor_Processing_Unit	A; R; LF, 403, H
TX0621	n/a	n/a	"TensorFloat-32 in the A100 GPU Accelerates AI Training, HPC up to 20x" NVIDIA, May 14, 2020, accessed at: https://blogs.nvidia.com/blog/2020/05/14/tensorfloat-32-precision-format/;	A; LF; 403; H; 703
TX0622	n/a	n/a	"The Deep Learning Revolution and Its Implications for Computer Architecture and Chip Design"	A; LF; 403; H; 704
TX0623	n/a	n/a	"The IEEE 754 Format" Emory Oxford College Department of Mathematics and Computer Science, accessed at: http://mathcenter.oxford.emory.edu/site/cs170/ieee754/.	
TX0624	n/a	n/a	"The surprising usefulness of sloppy arithmetic" MIT News, January 3, 2011, accessed at: https://news.mit.edu/2010/fuzzy-logic-0103	A; R; LF, 403, H
TX0625	n/a	n/a	"TPU vs GPU: Pros and Cons" Inmotion Hosting, June 28, 2021, accessed at: https://www.inmotionhosting.com/support/product-guides/private-cloud/tpu-vsgpu/#:~:text=GPUs%20have%20the%20ability%20to,while%20also%20using%20fewer%20resources	A; R; LF, 403, H
TX0626	n/a	n/a	"Train and run machine learning models faster - Cloud TPU" Google Cloud	A; R; LF, 403, H
TX0627	n/a	n/a	"Train with Mixed Precision" NVIDIA, March 2022, accessible at: https://docs.nvidia.com/deeplearning/performance/pdf/Training-Mixed-Precision-User-Guide.pdf.	A; R; LF, 403, H
TX0628	n/a	n/a	"Training PyTorch models on Cloud TPU Pods" Google Cloud, accessed at: https://cloud.google.com/tpu/docs/tutorials/pytorch-pod	A; R; LF, 403, H
TX0629	n/a	n/a	"What makes TPUs fine-tuned for deep learning?" Google Cloud, August 30, 2018, accessed at: https://cloud.google.com/blog/products/ai-machine-learning/what-makes-tpus-fine-tuned-for-deep-learning.	A; R; LF, 403, H
TX0630	n/a	n/a	"Why your free software is never free" Vox, January 29, 2020, accessed at: https://www.vox.com/recode/2020/1/29/21111848/free-software-privacy-alternative-data	A; R; LF, 403, H
TX0631	n/a	n/a	"X Timeline" X, accessed at: https://x.company/	A; R; LF, 403, H

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0632	n/a	n/a	"Alphabet In AI: How Google Went From A Search Engine To An $800B Global AI Powerhouse," CBInsights, October 24, 2019, available at https://www.cbinsights.com/research/report/alphabet-google-artificial-intelligence/	A; R; LF, 403, H
TX0633	n/a	n/a	"Bringing the benefits of AI to everyone," Google AI, available at https://ai.google/about/	A; R; LF, 403, H
TX0634	n/a	n/a	"Helpful products. Built with you in mind.," Google, available at http://www.google.com/about/company/products	A; R; LF, 403, H
TX0635	n/a	n/a	"Introduction to Cloud TPU," Google Cloud, available at https://cloud.google.com/tpu/docs/intro-to-tpu	A; R; LF, 403, H
TX0636	n/a	n/a	"Machine Learning Glossary," Google, available at https://developers.google.com/machine-learning/glossary	A; R; LF, 403, H
TX0637	n/a	n/a	"Singular Computing Overview," PitchBook, available at https://pitchbook.com/profiles/company/510550-93#overview	A; R; LF, 403, H
TX0638	n/a	n/a	"teraflop," Merriam-Webster, available at https://www.merriam-webster.com/dictionary/teraflop	A; R; LF, 403, H
TX0639	n/a	n/a	"v0.5 Results," ML Commons, December 12, 2018, available at https://mlcommons.org/en/training-normal-05	LF, 703, PK
TX0640	n/a	n/a	"v0.6 Results," ML Commons, June 10, 2019, available at https://mlcommons.org/en/training-normal-06/	LF, 703, PK
TX0641	n/a	n/a	"Which Companies Spend the Most in Research and Development (R&D)?," Nasdaq, June 21, 2021, available at https://www.nasdaq.com/articles/which-companies-spend-the-most-in-research-and-development-rd-2021-06-21	A; R; LF, 403, H
TX0642	n/a	n/a	Alphabet Inc.'s (Google) Form 10-K for the Fiscal Year Ended December 31, 2014	R, LF, 403, 901, 1006, MIL
TX0643	n/a	n/a	Alphabet Inc.'s Form 10-K for the Fiscal Year Ended December 31, 2016	R, LF, 403, 901, 1006, MIL
TX0644	n/a	n/a	Alphabet Inc.'s Form 10-K for the Fiscal Year ended December 31, 2017	R, LF, 403, 901, 1006, MIL
TX0645	n/a	n/a	Alphabet Inc.'s Form 10-K for the Fiscal Year ended December 31, 2019	R, LF, 403, 901, 1006, MIL
TX0646	n/a	n/a	Alphabet Inc.'s Form 10-K for the Fiscal Year Ended December 31, 2021	R, LF, 403, 901, 1006, MIL
TX0647	n/a	n/a	Andrew Ng Curriculum Vitae (Ng Deposition Exhibit No. 3)	R, LF, A
TX0648	n/a	n/a	Andrew Ng Wikipedia page (accessed June 26, 2021) (Ng Deposition Exhibit No. 2)	R, LF, A
TX0649	n/a	n/a	AndrewNg.org "About Andrew Ng" (Ng Deposition Exhibit No. 4)	R, LF, A
TX0650	n/a	n/a	April 28, 2021 Defendant Google LLC's Response and Objection to Plaintiff's Second Set of Interrogatories (No. 11)	Defendant will respond with specific objections after Plaintiff provides its specific discovery designations.

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0651	n/a	n/a	Article "45 Year Study Reveals What It Takes to Raise Highly Intelligent Children" Power of Positivity, October 4, 2016, accessed at: https://www.powerofpositivity.com/45-year-study-reveals-takes-raise-highly-intelligent-children/.	A; R; LF, 403, H
TX0652	n/a	n/a	Article "6 reasons why Google open-sourced TensorFlow" pakthub, September 13, 2017, accessed at: https://hub.packtpub.com/google-opensorced-tensorflow/	A; R; LF, 403, H
TX0653	n/a	n/a	Article "A developer-friendly guide to mixed precision training with PyTorch" Spell, June 15, 2020, accessed at: https://spell.ml/blog/mixed-precision-training-with-pytorch-Xuk7YBEAACAASJam.	A; R; LF, 403, H
TX0654	n/a	n/a	Article "A Study of BFLOAT16 for Deep Learning Training" Kalamkar, et. al., June 13, 2019, accessed at: https://arxiv.org/pdf/1905.12322.pdf.	A; R; LF, 403, H
TX0655	n/a	n/a	Article "Accelerating AI Training with NVIDIA TF32 Tensor Cores" NVIDIA, January 27, 2021, accessed at: https://developer.nvidia.com/blog/accelerating-ai-training-with-tf32-tensor-cores/	A; R; LF, 403, H
TX0656	n/a	n/a	Article "AMD Radeon Instinct MI25 Accelerator" AMD, accessed at https://www.amd.com/en/products/professionalgraphics/instinct-mi25 (2023)	A; R; LF, 403, H
TX0657	n/a	n/a	Article "An in-depth look at Google's first Tensor Processing Unit (TPU)" Google Cloud, May 12, 2017, accessed at: https://cloud.google.com/blog/products/ai-machine-learning/an-in-depth-look-at-googles-first-tensor-processingunit-tpu.	A; R; LF, 403, H
TX0658	n/a	n/a	Article "An Overview: Global Data Center Construction" WiredRE, accessed at: https://wiredre.com/an-overview-global-data-center-construction/ (2023)	A; R; LF, 403, H
TX0659	n/a	n/a	Article "Apigee to be Acquired" CNBC, September 8, 2016, accessed at: https://www.cnbc.com/2016/09/08/apigee-tobe-acquired-by-google-in-625-million-all-cash-deal.html	A; R; LF, 403, H
TX0660	n/a	n/a	Article "Arm Processor" TechTarget, accessed at: https://www.techtarget.com/whatis/definition/ARM-processor (May 1, 2022)	A; R; LF, 403, H
TX0661	n/a	n/a	Article "AWS Inferentia" AWS, accessed at: https://aws.amazon.com/machine-learning/inferentia/;	A; R; LF, 403, H
TX0662	n/a	n/a	Article "AWS Trainium" AWS, accessed at: https://aws.amazon.com/machine-learning/trainium/.	A; R; LF, 403, H

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0663	n/a	n/a	Article "Benchmarking TPU, GPU, and CPU Platforms for Deep Learning" Wang, et. al., 2019, pp. 10-11, accessed at: https://www.researchgate.net/publication/334695156_Benchmarking_TPU_GPU_and_CPU_Platforms_for_Deep_Learning (July 24, 2019)	A; R; LF, 403, H
TX0664	n/a	n/a	Article "BFloat16 processing for Neural Networks on Armv8-A" Arm Community Blogs, accessed at: https://community.arm.com/arm-community-blogs/b/ai-and-ml-blog/posts/bfloat16-processing-for-neural-networkson-armv8_2d00_a	A; R; LF, 403, H
TX0665	n/a	n/a	Article "Brain" X, accessed at: https://x.company/projects/brain/	A; R; LF, 403, H
TX0666	n/a	n/a	Article "Building an AI Chip Saved Google From Building a Dozen New Data Centers" Wired, April 5, 2017, accessed at: https://www.wired.com/2017/04/building-ai-chip-saved-google-building-dozen-new-data-centers/.	A; R; LF, 403, H
TX0667	n/a	n/a	Article "Cloud TPU" Google Cloud, accessed at: https://cloud.google.com/tpu	A; R; LF, 403, H
TX0668	n/a	n/a	Article "CPU vs. GPU What's the Difference?"	A, LF, PK, 403, H
TX0669	n/a	n/a	Article "Data and Security" Google Data Centers, accessed at: https://www.google.com/about/datacenters/datasecurity/	A; R; LF, 403, H
TX0670	n/a	n/a	Article "Deep Learning Training vs. Inference: What's the Difference?", AMD Xilinx, accessed at: https://www.xilinx.com/applications/ai-inference/difference-between-deep-learning-training-andinferencehtml#:~:text=In%20the%20training%20phase%2C%20a,data%20to%20produce%20actionable%20results	A; R; LF, 403, H
TX0671	n/a	n/a	Article "Express Route to Learning Fashioned for Precocious" The New York Times, February 28, 1973, accessed at: https://www.nytimes.com/1973/02/28/archives/express-route-to-learning-fashioned-for-precocious-secondprogram.html.	LF, H, A, 401, 403
TX0672	n/a	n/a	Article "Floating-Point Formats in the World of Machine Learning" Electronic Design, September 9, 2022, accessed at: https://www.electronicdesign.com/technologies/embeddedrevolution/article/21250407/electronic-design-floatingpoint-formats-in-the-world-of-machine-learning	LF, H, A, 401, 403
TX0673	n/a	n/a	Article "For Machine Learning, It's All About GPUs" Forbes, December 1, 2017, accessed at: https://www.forbes.com/sites/forbestechcouncil/2017/12/01/for-machine-learning-its-all-aboutgpus/?sh=64d0140b7699	LF, H, A, 401, 403
TX0675	n/a	n/a	Article "Go up, over, and inside Google's huge Iowa data centers in this new video" VentureBeat, April 17, 2015, accessed at: https://venturebeat.com/business/go-up-over-and-inside-googles-huge-iowa-data-centers-in-this-newvideo/	LF, H, A, R, 403

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0676	n/a	n/a	Article "Going Green: Google's Jackson County, Alabama Data Center," 123 Door Shield, February 25, 2021, accessed at: https://www.123doorshield.com/going-green-googles-jackson-countyalabama-data-center/#:~:text=The%20entire%20data%20center%20will,the%2Dart%20energy%20efficiency%20technology	LF, H, A, R, 403
TX0677	n/a	n/a	Article "Google acquires Toronto University startup focused on neural networks" ComputerWorld, March 13, 2013, accessed at: https://www.computerworld.com/article/2495286/google-acquires-toronto-university-startup-focusedon-neural-networks.html	LF, H, A, R, 403
TX0678	n/a	n/a	Article "Google acquisition of Looker to boost Google Cloud analytics" TechTarget, June 6, 2019, accessed at: https://www.techtarget.com/searchbusinessanalytics/news/252464715/Google-acquisition-of-Looker-to-boost-Google-Cloud-analytics	LF, H, A, R, 403
TX0679	n/a	n/a	Article "Google Affiliate's Latest Move Signals Selection of KC for $600M Data Center," Kansas City Business Journal, August 28, 2019, accessed at: https://www.bizjournals.com/kansascity/news/2019/08/28/google-data-center-deed-executed-for-kcmo-land.html	LF, H, A, R, 403
TX0680	n/a	n/a	Article "Google Announces $25 Million Expansion Locally," Main Street Clarksville, April 20, 2022, accessed at: https://www.mainstreetclarksville.com/community/google-announces-25-millionexpansion-locally/article_5ca53d14-c008-11ec-8082-6b5569a0cded.html	LF, H, A, R, 403
TX0681	n/a	n/a	Article "Google Announces $300M Data Center Expansion in Georgia," Elevate Douglas, accessed at: https://elevatedouglas.com/google-announces-300m-data-center-expansion-in-georgia/	LF, H, A, R, 403
TX0682	n/a	n/a	Article "Google Announces $500M Investment, Expanding Data Center in Berkeley County," Charleston News & Weather, March 18,2021, accessed at: https://www.counton2.com/news/localnews/berkeley-county-news/google-announces-500m-investment-expanding-data-center-in-berkeley-county/	LF, H, A, R, 403
TX0683	n/a	n/a	Article "Google Announces $600M Data Center Expansion in Loudoun County, Loudoun Virginia Economic Development, March 18, 2021, accessed at: https://biz.loudoun.gov/2021/03/18/google-600-million-data-center-expansion-loudoun/	LF, H, A, R, 403

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0684	n/a	n/a	Article "Google Announces $75M Oklahoma Investment at Mayes County Data Center," News on 6, May 4, 2022, accessed at: https://www.newson6.com/story/6272d8335c64ff762028a301/google-announces-75m-oklahoma-investment-at-mayes-county-data-center	LF, H, A, R, 403
TX0685	n/a	n/a	Article "Google Announces Plans to Invest Over $30 Million in Nevada This Year," Nevada Business, April 25, 2022, accessed at: https://www.nevadabusiness.com/2022/04/googleannounces-plans-to-invest-over-30-million-in-nevada-this-year/	LF, H, A, R, 403
TX0686	n/a	n/a	Article "Google Begins Construction of $600MN Alabama Data Center," Construction Digital, May 16, 2020, accessed at: https://constructiondigital.com/technology-and-ai/google-beginsconstruction-of-dollar600mn-alabama-data-center	LF, H, A, R, 403
TX0687	n/a	n/a	Article "Google Breaks Ground on Columbus, Ohio, Data Center," Data Center Dynamics, June 23, 2022, accessed at: https://www.datacenterdynamics.com/en/news/google-breaks-ground-oncolumbus-ohio-data-center/	LF, H, A, R, 403
TX0688	n/a	n/a	Article "Google Buys French Startup Moodstocks" Business Insider, July 6, 2016, accessed at: https://www.businessinsider.com/google-buys-french-startup-moodstocks-2016-7	LF, H, A, R, 403
TX0689	n/a	n/a	Article "Google buys UK Artificial Intelligence Startup Deepmind for £400m" The Guardian, January 27, 2014, accessed at: https://www.theguardian.com/technology/2014/jan/27/google-acquires-uk-artificial-intelligence-startupdeepmind	LF, H, A, R, 403
TX0690	n/a	n/a	Article "Google CEO Sundar Pichai is taking over as CEO of Alphabet" TechCrunch, December 3, 2019, accessed at: https://techcrunch.com/2019/12/03/sundar-pichai-alphabet-ceo/	LF, H, A, R, 403
TX0691	n/a	n/a	Article "Google Data Center Under Construction in Northwest Omaha," City of Omaha, April 21, 2022, accessed at: https://www.cityofomaha.org/latest-news/883-google-data-center-underconstruction-in-northwest-omaha	LF, H, A, R, 403
TX0692	n/a	n/a	Article "Google Erects Fake Brain With ... Graphics Chips?" Wired, May 29, 2013, accessed at: https://www.wired.com/2013/05/gpus-in-the-data-center/	LF, H, A, R, 403
TX0693	n/a	n/a	Article "Google expands in Moncks Corner with $500 million investment" Charleston Regional Business Journal, March 22, 2021, accessed at: https://charlestonbusiness.com/news/technology/80220;	LF, H, A, R, 403

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0694	n/a	n/a	Article "Google kicks off construction on $600M Alabama data center" Made In Alabama, April 9, 2018, accessed at: https://www.madeinalabama.com/2018/04/google-kicks-off-construction-on-alabama-data-center/	LF, H, A, R, 403
TX0695	n/a	n/a	Article "Google Plans $1.2BN Data Center on 300 Acres in Eagle Mountain," Utah, Dgtl Infra, October 5, 2021, accessed at: https://dgtlinfra.com/google-data-center-eagle-mountain-utah/	LF, H, A, R, 403
TX0696	n/a	n/a	Article "Google Plans $1BN New Albany Data Center Expansion, Acquires 618 Acres for More Data Centers" Data Center Dynamics, August 20, 2021, accessed at https://www.datacenterdynamics.com/en/news/google-plans-1bn-new-albany-datacenter- expansion-acquires-618-acres-for-more-data-centers/	LF, H, A, R, 403
TX0697	n/a	n/a	Article "Google Plans a $600 Million Data Center Expansion in Council Bluffs, Hiring 31," Des Moines Register, October 21, 2022, accessed at: https://www.desmoinesregister.com/story/money/business/2022/10/21/google-data-center-council-bluffs-iowa-jobs-expansion/69578905007/	LF, H, A, R, 403
TX0698	n/a	n/a	Article "Google says data center expansion in The Dalles will cost $600 million" Oregon Live, September 26, 2013, accessed at: https://www.oregonlive.com/siliconforest/2013/09/google_says_data_center_expans.html#:~:text=Google%20built%20its%20first%20corporate,over%20the%20next%20several%20years.	LF, H, A, R, 403
TX0699	n/a	n/a	Article "Google Scoops Up Neural Networks Startup DNNresearch To Boost Its Voice and Image Search Tech" TechCrunch, March 12, 2013, accessed at: https://techcrunch.com/2013/03/12/google-scoops-up-neural-networksstartup-dnnresearch-to-boost-its-voice-and-image-search-tech/	LF, H, A, R, 403
TX0700	n/a	n/a	Article "Google to Acquire Looker" Alphabet, June 6, 2019, accessed at: https://abc.xyz/investor/news/releases/2019/0606/	LF, H, A, R, 403
TX0701	n/a	n/a	Article "Google to build another data center in Omaha, Nebraska," Data Center Dynamics, April 22, 2022, accessed at: https://www.datacenterdynamics.com/en/news/google-to-build-another-data-center-in-omaha-nebraska/	LF, H, A, R, 403
TX0702	n/a	n/a	Article "Google to Invest $75 Million More in Oklahoma," 2 News Oklahoma, May 4, 2022 accessed at: https://www.kjrh.com/news/local-news/google-to-announce-oklahoma-data-center-investment	LF, H, A, R, 403

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0703	n/a	n/a	Article "Google to Reorganize as Alphabet to Keep its Lead as an Innovator" The New York Times, August 10, 2015, accessed at: https://www.nytimes.com/2015/08/11/technology/google-alphabet-restructuring.html	LF, H, A, R, 403
TX0704	n/a	n/a	Article "Google to Spend $9.5B on US Data Centers and Offices This Year" Silicon Angle, April 13, 2022, accessed at https://siliconangle.com/2022/04/13/google-spend-9-5b-us-data-centers-offices-year/	LF, H, A, R, 403
TX0705	n/a	n/a	Article "Google: Storey Co. data center to be complete this year," Northern Nevada Business Weekly, March 22, 2021, accessed at: https://www.nnbw.com/news/2021/mar/22/google-storey-co-data-center-be-complete-year/	LF, H, A, R, 403
TX0706	n/a	n/a	Article "Google's Massive $600M Data Center Takes Shape in Ellis County as Tech Giant Ups Texas Presence," NBCDFW, June 14, 2019, accessed at: https://www.nbcdfw.com/local/dfwmorningnews-googles-massive-600m-data-center-takes-shape-in-ellis-county-as-tech-giant-ups-texas-presence/215275/	LF, H, A, R, 403
TX0707	n/a	n/a	Article "Graphics Processing Unit (GPU)" Investopedia, September 7, 2021, accessed at: https://www.investopedia.com/terms/g/graphicsprocessing-unitgpu.asp#:~:text=Nvidia%20was%20the%20very%20first,trading%20around%20%24645%20per%20share	LF, H, A, R, 403
TX0708	n/a	n/a	Article "In-Datacenter Performance Analysis of a Tensor Processing UnitTM" Jouppi, et. al., p. 3, accessed at: https://dl.acm.org/doi/pdf/10.1145/3140659.3080246 (2017)	LF, H, A, R, 403
TX0709	n/a	n/a	Article "Innovator: Joseph Bates" Bloomberg BusinessWeek, January 28, 2011, accessed at: https://www.bloomberg.com/news/articles/2011-01-28/innovator-joseph-bates	LF, H, A, R, 403, MIL
TX0710 (DUPE of TX0635)	n/a	n/a	Article "Introduction to Cloud TPU" Google Cloud, accessed at: https://cloud.google.com/tpu/docs/intro-totpu#cloud_tpus_are_not_suited_to_the_following_workloads	LF, H, A, R, 403
TX0711	n/a	n/a	Article "Microsoft's Qualcomm exclusivity deal for Windows on Arm reportedly ending soon", The Verge, November 23, 2021, accessed at: https://www.theverge.com/2021/11/23/22798231/microsoft-qualcomm-exclusivity-deal-windows-on-arm	LF, H, A, R, 403
TX0712	n/a	n/a	Article "New Albany Lands $600 Million Google Data Center," The New Albany Company, accessed at: https://newalbanycompany.com/new-albany-lands-600-million-google-data-center/	LF, H, A, R, 403

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0713	n/a	n/a	Article "Our plans to invest $9.5 billion in the U.S. in 2022" Google, April 13, 2022, accessed at: https://blog.google/inside-google/company-announcements/investing-america-2022/	LF, H, A, R, 403
TX0714	n/a	n/a	Article "Report: Google Plans Further Expansion in Wasco County, Oregon," Data Center Dynamics, September 28, 2021, accessed at: https://www.datacenterdynamics.com/en/news/googleplans-further-expansion-in-wasco-county-oregon-report/	LF, H, A, R, 403
TX0715	n/a	n/a	Article "Teaming Up With Oxford University" Google Europe Blog, October 23, 2014, accessed at: https://europe.googleblog.com/2014/10/teaming-up-with-oxford-university-on.html	LF, H, A, R, 403
TX0716	n/a	n/a	Article "TensorFlow: Large Scale Machine Learning on Heterogenous Distributed Systems" Abadi, et.al. for Google Research, November 9, 2015	LF, H, A, R, 403
TX0717	SINGULAR-00022607	SINGULAR-00022617	Article "The 62-Year-Old Child Genius" Topic, December 28, 2017, accessed at: https://www.topic.com/the-62-yearold-child-genius.	LF, H, A, R, 403, MIL
TX0718	n/a	n/a	Article "The Great A.I. Awakening" The New York Times Magazine, December 14, 2016, accessed at: https://www.nytimes.com/2016/12/14/magazine/the-great-ai-awakening.html	LF, H, A, R, 403
TX0719	n/a	n/a	Article “24 Most Profitable Low-Budget Movies Ever,” Alex Vo, March 29, 2016, available at https://editorial.rottentomatoes.com/gallery/24-most-profitable-low-budget-moviesever/#&gid=1&pid=8	LF, H, A, R, 403
TX0720	n/a	n/a	Article “AI is Transforming Google Search. The Rest of the Web is Next,” Cade Metz, WIRED, February 4, 2016, available at https://www.wired.com/2016/02/ai-is-changing-the-technology-behind-googlesearches/	LF, H, A, R, 403
TX0721	n/a	n/a	Article “Automatic Mixed Precision for NVIDIA Tensor Core Architecture in TensorFlow,” Amulya Vishwanath, Nvidia Developer, March 18, 2019, available at https://developer.nvidia.com/blog/nvidia-automatic-mixed-precision-tensorflow/	A; R; LF, 403, H
TX0722	n/a	n/a	Article “Empowering everyday innovation to build a more adaptive business,” Philip Brittan, Google Workspace, August 16, 2022, available at https://workspace.google.com/blog/future-of-work/thinkingof-innovation-as-an-everyday-habit; Bajpai, Prableen	LF, H, A, R, 403

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0723	n/a	n/a	Article "Google Removing Toolbar PageRank from Public View," Stephen Geldersma, 616 Marketing Group, available at https://www.616mg.com/google-confirms-removing-toolbar-pagerank/	LF, H, A, R, 403
TX0724	n/a	n/a	Article "Google spending $600M to expand Lenoir data center (Video)," Charlotte Business Journal, April 19, 2013, accessed at: https://www.bizjournals.com/charlotte/blog/power_city/2013/04/google-spending-600m-to-expand-lenoir.html	LF, H, A, R, 403
TX0725	n/a	n/a	Article "Google Turning Its Lucrative Web Search Over to AI Machines," Jack Clark, Bloomberg, October 26, 2015, available at https://www.bloomberg.com/news/articles/2015-10-26/google-turningits-lucrative-web-search-over-to-ai-machines?leadSource=uverify%20wall	LF, H, A, R, 403
TX0726	n/a	n/a	Article "How did Google surpass all the other search engines?," Nikhil Dandekar, Medium, March 8, 2017, available at https://medium.com/@nikhilbd/how-did-google-surpass-all-the-other-searchengines-8a9fddc68631	LF, H, A, R, 403
TX0727	n/a	n/a	Article "Technology Still Dominates the Current Top 10 Holdings in Hedge Funds," Lee Jackson, 247wallst, June 12, 2018, available at https://247wallst.com/investing/2018/06/12/technology-stilldominates-the-current-top-10-holdings-in-hedge-funds/	LF, H, A, R, 403
TX0728	n/a	n/a	Article "Why R&D Spending Is Not A Measure Of Innovation," Tendayi Viki, Forbes, August 21, 2016, available at https://www.forbes.com/sites/tendayiviki/2016/08/21/why-rd-spending-is-not-a-measureof-innovation/?sh=38a4a796c77d	LF, H, A, R, 403
TX0729	n/a	n/a	Article, Belletti, F. et al.: "Tensor Processing Units for Financial Monte Carlo" in Proceedings of the 2020 SIAM Conference on Parallel Processing for Scientific Computing (PP), 2020	A; R; LF, 403, H
TX0730 (DUPE of TX0937)	n/a	n/a	Article: Aerial view of Google's Berkeley County Data Center, Post and Courier, February 14, 2019, by John McDermott https://www.charlestondigitalcorridor.com/news/1550193783328-google-expand-charleston-area-data-center/.	LF, H, A, R, 403
TX0731 (DUPE of TX0732)	n/a	n/a	August 23, 2019 Article "BFloat16: The secret to high performance on Cloud TPUs" Google Cloud, August 23, 2019, accessed at: https://cloud.google.com/blog/products/ai-machine-learning/bfloat16-the-secret-to-high-performance-on-cloud-tpus	LF, H, A, R, 403
TX0732	n/a	n/a	August 23, 2019 Google Cloud Product News Article "AI & Machine Learning, BFloat16: The secret to high performance on Cloud TPUs" by Shibo Wang, Pankaj Kanwar (Patterson Deposition Exhibit No. 16)	A; R; LF, 403, H

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0733	n/a	n/a	August 9, 2022 Article "Explosion at Google Data Center Critically Burns 3 Workers" Newsweek, August 9, 2022, accessed at: https://www.newsweek.com/explosion-google-data-center-critically-burns-3-workers-1732178	LF, H, A, R, 403
TX0734	n/a	n/a	Book excerpts, Makino and Taiji "Scientific Simulations with Special-Purpose Computers – The GRAPE Systems" 1998 (Dr. Khatri 3/3/23 Report Exhibit D)	R, H, LF, 403, 703
TX0735	n/a	n/a	Butler, Bryan W., Patent Infringement: Compensation and Damages, Law Journal Press (2009), at §4.02	A; R; LF, 403, H
TX0740	n/a	n/a	Codelabs Article "What are Tensor Processing Units (TPUs)?" https://codelabs.developers.google.com/codelabs/keras-flowers-convnets/#2	A; R; LF, 403, H
TX0741	n/a	n/a	December 14, 2016 Article "The Great A.I. Awakening - How Google used artificial intelligence to transform Google Translate, one of its more popular services - and how machine learning is poised to reinvent computing itself," Article by G. Lewis-Kraus, New York Times, downloaded June 23, 2021 (Teller Deposition Exhibit No 33; Dean Deposition Exhibit No. 5)	LF, H, A, R, 403
TX0742	n/a	n/a	December 22, 2022 Expert Report of Phil Isaak (with exhibits)	1006, 403
TX0743	n/a	n/a	December 22, 2022 Opening Report of Dr. Sunil Khatri	1006, 403
TX0744	n/a	n/a	Declaration of Richard Goodin (PTAB, Google Ex. 1003) November 15, 2020 (Dr. Khatri 12/22/22 Report Exhibit C)	R, LF, H, 403, 703, IER
TX0745	n/a	n/a	Excerpts from SC1992 Conference Proceedings: Table of Contents, List of Referees, and other relevant portions from 1992 International Conference for High Performance Computing, Networking, Storage and Analysis (1992) (Dr. Khatri 3/3/23 Report Exhibit E)	LF, H, A, R, 403, 703
TX0746	n/a	n/a	February 25, 2021 Defendant Google LLC's Fourth Supplemental Responses and Objections to Plaintiff's First Set of Interrogatories Nos. 1-10	Defendant will respond with specific objections after Plaintiff provides its specific discovery designations.
TX0747	n/a	n/a	Final Written Decision IPR2021-00165 Issued May 11, 2022	
TX0748	n/a	n/a	Final Written Decision IPR2021-00179 Issued May 11, 2022	
TX0749	n/a	n/a	GOOG 10-K for Fiscal Year ended 12/31/2014	R, LF, 403, 901, 1006, MIL
TX0750	n/a	n/a	GOOG 10-K for Fiscal Year ended 12/31/2016	R, LF, 403, 901, 1006, MIL
TX0751	n/a	n/a	GOOG 10-K for Fiscal Year ended 12/31/2019	R, LF, 403, 901, 1006, MIL
TX0752	n/a	n/a	GOOG 10-K for Fiscal Year ended 12/31/2021	R, LF, 403, 901, 1006, MIL
TX0753	n/a	n/a	Google 10K Fiscal Year Ending December 31, 2020	R, LF, 403, 901, 1006, MIL
TX0754	n/a	n/a	Google Cloud Blog: "An in-depth look at Google's first Tensor Processing Unit (TPU)" May 12, 2017 (Dr. Khatri 12/22/22 Report Exhibit J)	LF, H, A, R, 403

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TX0755	n/a	n/a	Google Cloud webpage "System architecture/Cloud TPU/Google Cloud" (accessed January 25, 2020) https://cloud.gcx)gle.com/tpu/docs/system-architecture/ (Patterson Deposition Exhibit No. 15)	LF, H, A, R, 403
TX0756	n/a	n/a	Google Earth - Council Bluffs IA Aerial.jpg	LF, H, A, R, 403
TX0757	n/a	n/a	Google Earth Aerial View of Council Bluffs IA SLN Data Center, Google, June 13, 2021, https://earth.google.com/web/search/41.17534258547408,+-95.80325462740403/@41.17685545,-95.80248915,298.870988a,1076.127594344,35y,164.97976599h,59.99860348t,0r/data=CigUgokCbg9ez6RmkRAERFG65HekORAGQcmxbq571fAlVcYa Ff09FfA.	LF, H, A, R, 403
TX0758	n/a	n/a	Google Earth Aerial View of Lenoir NC Data Center", Google, https://earth.google.com/web/search/35%c2%b053%2754.8%22N+81%c2%b032%2750.6%22W/@35.89582963,-81.54739909,328.88752715a,1263.91500753d,35y,169.7503671h,45.0025608t,Or/data.CigUgokCWgF8br9EFAEQ,IxNsx38kFAGYR-CezbYVTAIRSpgzplY1TA.	LF, H, A, R, 403
TX0759	n/a	n/a	Google Earth Aerial view of Mayes County OK 10-28-2017.pdf	LF, H, A, R, 403
TX0760 (DUPE of TX0592)	n/a	n/a	Google Earth Berkeley SC Data Center Building 1-29-2021.pdf	LF, H, A, R, 403
TX0761	n/a	n/a	Google Earth Council Bluffs Data Center -4-story bldg June 13, 2021.pdf	LF, H, A, R, 403
TX0762	n/a	n/a	Google Research webpage About Dave Patterson (accessed February 19, 2021) (Patterson Deposition Exhibit 3)	LF, H, A, R, 403
TX0763	n/a	n/a	Hayes, Adam, "Price-to-Research Ratio – PRR Definition," Investopedia, July 9, 2021, available at https://www.investopedia.com/terms/p/pricetoresearchratio.asp	LF, H, A, R, 403
TX0765	n/a	n/a	IEEE Xplore Article: "The Design Process for Google's Training Chips: TPUv2 and TPUv3" by T. Norrie, N. Patil, N. Jouppi, D. Patterson et al., IEEE Micro (Volume 41, Issue 2, March-April 2021), (downloaded February 28, 2021)	LF, H, A, R, 403
TX0766	n/a	n/a	Jeff Dean twitter thread re bfloat16-- https://twitter.com/JeffDean/status/1134523127357161473	R, A, 403, LF, H
TX0767	n/a	n/a	Johnny Chen's LinkedIn Profile (accessed August 17, 2021) (Chen Deposition Exhibit No. 2)	LF, H, A, R, 403
TX0768	n/a	n/a	July 13, 2021 Defendant's Fifth Supplemental Reponses and Objections to Plaintiff's Third Set of Interrogatories (Nos. 12-20)	Defendant will respond with specific objections after Plaintiff provides its specific discovery designations.

Singular Computing's Trial Exhibit List

Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0769	n/a	n/a	July 13, 2021 Defendant's Fourth Supplemental Responses and Objections to Plaintiff's Fifth Set of Interrogatories (Nos. 22-30)	Defendant will respond with specific objections after Plaintiff provides its specific discovery designations.
TX0770	n/a	n/a	July 15, 2021 Defendant's Sixth Supplemental Responses and Objections to Plaintiff's Third Set of Interrogatories (Nos. 12-20)	Defendant will respond with specific objections after Plaintiff provides its specific discovery designations.
TX0771	n/a	n/a	July 16, 2021 Defendant's Fifth Supplemental Responses and Objections to Plaintiff's Fifth Set of Interrogatories (Nos. 22-30)	Defendant will respond with specific objections after Plaintiff provides its specific discovery designations.
TX0772	n/a	n/a	July 2020 Communications of the ACM Article: "A Domain-Specific Supercomputer for Training Deep Neural Networks"	
TX0773	n/a	n/a	July 23, 2021 Defendant Google LLC's Sixth Supplemental Responses and Objections to Plaintiff's First Set of Interrogatories (Nos. 1-10)	Defendant will respond with specific objections after Plaintiff provides its specific discovery designations.
TX0774	n/a	n/a	July 23, 2021 Defendant Google LLC's Sixth Supplemental Responses and Objections to Plaintiffs First Set of Interrogatories (NOS. 1-10).	Defendant will respond with specific objections after Plaintiff provides its specific discovery designations.
TX0775	n/a	n/a	July 23, 2021 Plaintiff's Third Supplemental Response to Defendant's First Set of Interrogatories (No. 11), Second Supplemental Response	H, LF, 403
TX0776	n/a	n/a	June 16, 2009 Provisional Patent Application No. 62/218,691 (Plotkin Deposition Exhibit No. 0001259)	
TX0777	n/a	n/a	Linked in Profile of Nishant Patil (accessed July 15, 2021) (Patil Deposition Exhibit No. 2)	LF, H, A, R, 403
TX0778	n/a	n/a	March 27, 2019 Transcript of video of David Patterson talk at Scaled ML Conference re Domain-Specific Architecture for Deep Neural Networks (Patterson Deposition Exhibit No. 7)	R, LF, H, A, 403, C, 404(a), 1002, PK, 703
TX0779	n/a	n/a	March 27, 2019 Video of David Patterson talk at Scaled ML Conference re Domain-Specific Architecture for Deep Neural Networks (Patterson Deposition Exhibit No. 6)	R, LF, H, A, 403, C, 404(a), 1002, PK, 703
TX0780	n/a	n/a	March 3, 2017 VIDEO of David Patterson talk at UC Berkeley, Department of Electrical Engineering and Computer Science EECS Colloquium - Evaluation of the Tensor Processing Unit: A Deep Neural Network Accelerator for the Datacenter (Patterson Deposition Exhibit No. 8)	R, LF, H, A, 403, C, 404(a), 1002, PK, 703
TX0781	n/a	n/a	March 3, 2023 Rebuttal Expert Report of Sunil P. Khatri, PhD.	IER, 1006, H, 403, 703
TX0782	n/a	n/a	May 17, 2017 Article "Build and Train Machine learning models on our new Google Cloud TPUs" by Jeff Dean	LF, H, 403, PK

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0783	n/a	n/a	May 2002 Pavle Belanovic thesis, Library of Parameterized Hardware Modules for Floating- Point Arithmetic with An Example Application	
TX0784	n/a	n/a	May 3, 2017 Transcript of video of David Patterson talk at UC Berkeley, Department of Electrical Engineering and Computer Science EECS Colloquium - Evaluation of the Tensor Processing Unit: A Deep Neural Network Accelerator for the Datacenter (Patterson Deposition Exhibit No. 9)	R, LF, H, A, 403, C, 404(a), 1002, PK, 703
TX0785	n/a	n/a	November 1, 2018 Article "BFLOAT16 – Hardware Numerics Definition" Intel, November 2018, Revision 1.0, p. 5, accessed at: https://www.intel.com/content/dam/develop/external/us/en/documents/bf16-hardware-numerics-definition-whitepaper.pdf	R, LF, H, A, 403, PK, 703
TX0786	n/a	n/a	October 16, 2019 Transcript of video of David Patterson's talk at MIT re: MIT CSAIL Domain Specific Architectures for Deep Neural Networks: Three Generations of Tensor Processing Units (TUPs) (Patterson Deposition Exhibit No. 5)	R, LF, H, A, 403, C, 404(a), 1002, PK, 703
TX0787	n/a	n/a	October 16, 2019 VIDEO of David Patterson's talk at MIT (Patterson Deposition Exhibit No. 4)	R, LF, H, A, 403, C, 404(a), 1002, PK, 703
TX0788	n/a	n/a	October 29, 2019 Transcript of video of David Patterson talk at University of Washington, Paul G. Allen School of Computer Science & Engineering's Distinguished Lecture Series Domain Specific Architecture for Deep neural Networks: Three Generations of Tensor Processing Units (TPUs) (Patterson Deposition Exhibit No. 11)	R, LF, H, A, 403, C, 404(a), 1002, PK, 703
TX0789	SINGULAR-00058871	SINGULAR-00058871	October 29, 2019 VIDEO of David Patterson talk at University of Washington, Paul G. Allen School of Computer Science & Engineering's Distinguished Lecture Series Domain Specific Architecture for Deep neural Networks: Three Generations of Tensor Processing Units (TPUs) (Patterson Deposition Exhibit No. 10)	R, LF, H, A, 403, C, 404(a), 1002, PK, 703
TX0790	n/a	n/a	Oxford Dictionary of Computer Science	LF, H, A, R, 403, 1006
TX0791	n/a	n/a	Paper "The Deep Learning Revolution and Its Implications for Computer Architecture and Chip Design" by Jeffrey Dean	LF, H, A, R, 403, PK
TX0792	n/a	n/a	Photo of data center in Dalles, OR www.google.com/about/datacenters/gallery/ (accessed March 27, 2023) (Mares Deposition Exhibit No. 6)	A; R; LF, 403, H
TX0793	n/a	n/a	Photo of Google data center Lenoir, NC from www.google.com/about/datacenters/gallery/ (accessed March 27, 2023) (Mares Deposition Exhibit No. 5)	A; R; LF, 403, H
TX0797	n/a	n/a	Pindyck, Robert, "Lecture Notes on Vertical Structure," 15.013 – Industrial Economics for Strategic Decisions, August 2011, available at https://web.mit.edu/rpindyck/www/Courses/VS_11.pdf	R, LF, H, A, 403, C, 404(a), 1002, PK, 703

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0798	n/a	n/a	Presentation, Jeff Dean: "TensorFlow w/XLA: TensorFlow, Compiled!" (Dr. Khatri 12/22/22 Report Exhibit N)	
TX0799	n/a	n/a	Publication "A Golden Decade of Deep Learning: Computing Systems & Applications" Daedalus, authored by Jeffrey A. Dean, Spring 2022 edition, accessed at: https://www.amacad.org/publication/golden-decade-deep-learningcomputing-systems-applications.	
TX0800	n/a	n/a	Publication, Atsushi Kawai, et. al. "GRAPE-5: A Special-Purpose Computer for N-Body Simulations" 2000, Publications of the Astronomical Society of Japan, v.52, p.659-676 ("Kawai") (Dr. Khatri 3/3/23 Report Exhibit C)	R, H, LF, 403, 703
TX0801	n/a	n/a	Screenshot of an aerial view of a Google data center 300+ acres, 2.75 miles around data center buildings the size of 235 American football fields (Mares Deposition Exhibit No. 7)	A; R; LF, 403, H
TX0802	n/a	n/a	September 12, 2018 Podcast Notes with transcript "Google AI with Jeff Dean" (gcppodcast.com) (Dean Deposition Exhibit No. 3)	A, R, LF, C, 403, H, PK, 1002
TX0803	n/a	n/a	Spreadsheet "Precog AdBrain Launch Stats May 2015 - November 2018 (Shafiei 30(b)(6) Deposition Exhibit No. 22)	R, 403, LF, PK, MIL
TX0804	n/a	n/a	TPUv2 Block Diagram (Patterson Deposition Exhibit No. 14)	R, LF, H, A, 403, C, 1002
TX0805	n/a	n/a	U.S. Patent No. 11,275,992 "Special purpose neural network training chip"	
TX0806	n/a	n/a	Undated Facilities Global chart (Mares Deposition Exhibit No. 11)	A, R, LF, H, C, 703, PK
TX0807	n/a	n/a	Undated handwritten math notes totaling 18,135 (Mares Deposition Exhibit No. 10)	R, 403, LF, 703
TX0808	n/a	n/a	Undated handwritten notes and diagram/sketch (Phelps Deposition Exhibit No. 8)	403
TX0809	n/a	n/a	University of California, Berkeley, Practical Approximate Computing, YouTube (Mar. 31, 2016), https://www.youtube.com/watch?v=aHkWX3QctkM&t=3s	A, R, H, LF, 403
TX0810	n/a	n/a	Voth, Drew, Brian C. Park, and Nathan C. Brunette, “Apportionment of Intellectual Property Value: Where Economic Theory Meets Legal Practice,” The Federal Lawyer, October/November 2013, pp. 72-91, at 75, available at https://www.fedbar.org/wp-content/uploads/2013/10/feature9-octnov13-pdf-1.pdf	A; R; LF, 403, H
TX0811	n/a	n/a	Wade Spees, "A aerial view of the Google Data Center in Berkeley County on Thursday, April 20, 2017.", Post and Courier, https://www.postandcourier.com/google-data-center-in-berkeley-county/collection_d19037ee-251e-11e7-9dc2-3b657c9f3f8f.htmlig	A; R; LF, 403, H
TX0812	n/a	n/a	Webpage "About Jeffrey Dean from Google Research" (accessed July 21, 2021) (Dean Deposition Exhibit No. 1)	A; R; LF, 403, H

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0813	n/a	n/a	Webpage, Google Cloud, "Build and train machine learning models on our new Google Cloud TPUs" by Jeff Dean and Urs Holzle (accessed December 17, 2019) (Dean Deposition Exhibit No. 8)	A, LF, H, 403, PK
TX0814	n/a	n/a	Whitepaper "NVIDIA Tesla P100" (Dr. Khatri 12/22/22 Report Exhibit M)	A, LF, H, 403
TX0815	n/a	n/a	Whitepaper "NVIDIA TESLA V100 GPU" (August 2017) (Dr. Khatri 12/22/22 Report Exhibit L)	A, LF, H, 403
TX0816	n/a	n/a	Wildstar Hardware Reference Manual, 12392-0000 Revision 6.2 (1998-2004) (Dr. Khatri 3/3/23 Report Exhibit B)	A, LF, H, 403
TX0817	n/a	n/a	Xilinx - Zynq-7000 SoC Data Sheet: Overview. July 2, 2018 (Dr. Khatri 12/22/22 Report Exhibit K)	A, LF, H, 403
TX0819	SINGULAR-00000004	SINGULAR-00000005	March 25, 2013 Assignment 9,218,156 (Joseph Bates to Singular Computing LLC)	H
TX0820	SINGULAR-00000233	SINGULAR-00000311	June 16, 2009 Provisional Patent Application No. 62/218,691	
TX0823	SINGULAR-00001833	SINGULAR-00001834	February 17, 2012 Assignment 8,407,273 (Joseph Bates to Singular Computing LLC)	H
TX0825	SINGULAR-00001983	SINGULAR-00001984	Certificate of Correction for U.S. Patent No. 9,218,156	A, H, PK
TX0826	SINGULAR-00002104	SINGULAR-00002132	U.S. Patent No. 8,407,273 "Processing with Compact Arithmetic Processing Element"	
TX0827	SINGULAR-00004187	SINGULAR-00004224	Other Transaction for Prototype Agreement between Intrinsix and Space and Naval Warfare Systems Center Pacific Concerning Revolutionizing the Nation's ISR and Computer Vision Capabilities by Accelerating Exploitation of Approximate Computing Technology (2014)	A, H, LF, 403
TX0828	SINGULAR-00004225	SINGULAR-00004279	June 6, 2013 Design Agreement between Intrinsix and Singular Computing	A, H, LF, 403
TX0829	SINGULAR-00004969	SINGULAR-00004969	October 2010 Poster "10,000x More Efficient Computing" by Joseph Bates, George Shaw, Deb Roy	MIL; R; H; LF; 403; A, 701, 702, 703
TX0832	SINGULAR-00006660	SINGULAR-00006663	November 21, 2008 Joe Bates' Contemporaneous Notes with Alfred, Peter	R, LF, H, A, 403, 701, 702, 703, 704, MIL
TX0833	SINGULAR-00006847	SINGULAR-00006865	September 2013 Singular Presentation slides "Multi-Million Core Processors and Their Applications" by Joe Bates	MIL; R; H; LF; 403; A, 701, 702, 703
TX0834	SINGULAR-00006867	SINGULAR-00006867	September 17, 2013 J. Bates Contemporaneous Notes re Google Brain presentation	R, LF, H, A, 403, 701, 702, 703, 704, MIL
TX0835	SINGULAR-00006870	SINGULAR-00006870	January 24, 2014 Google - Nan Boden, Norm Jouppi (for Jeff Dean)	R, LF, H, A, 403, 701, 702, 703, 704, MIL
TX0836	SINGULAR-00006889	SINGULAR-00006916	February 2017 Singular Presentation slides "Approximate Computing, Embedded AI, Billion Core Systems" Joseph Bates	MIL; R; H; LF; 403; A, 701, 702, 703
TX0837	SINGULAR-00009701	SINGULAR-00009723	June 2017 Document "Singular S1 Overview"	A, LF, PK, 403, H
TX0838	SINGULAR-00010314	SINGULAR-00010315	Singular Computing End User License Agreement for Evaluating Singular Technology	R, A, H, LF, 403

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0839	SINGULAR-00011044	SINGULAR-00011044	September 23, 2015 Sandia National Laboratories Invoice to Singular Computing	R, A, H, LF, 403
TX0840	SINGULAR-00011489	SINGULAR-00011489	Singular 2018 Profit Loss Statement	R, A, H, LF, 403
TX0841	SINGULAR-00012052	SINGULAR-00012059	Services and Evaluation License Agreement between Apple and Singular Computing LLC, effective September 18, 2017	
TX0842	SINGULAR-00012070	SINGULAR-00012083	Research Agreement between Fujitsu Laboratories LTD and Fujitsu Consulting Inc. and Singular Computing, effective April 1, 2018	
TX0843	SINGULAR-00012519	SINGULAR-00012545	November 2010 through July 2011 J. Bates Contemporaneous Notes from meetings with Astro Teller and GoogleX	
TX0844	SINGULAR-00014320	SINGULAR-00014373	September 3, 2015 "Singular Architecture Specification" Revision 16	R, H, 403, LF, A
TX0846	SINGULAR-00016080	SINGULAR-00016081	December 20, 2010 Email from Teller to Bates re: Contact	R, H, 403, LF, MIL
TX0847	SINGULAR-00016089	SINGULAR-00016089	May 6, 2011 'Email from Teller to Bates re: Sorry but...	R, H, 403, LF, MIL
TX0848	SINGULAR-00016359	SINGULAR-00016360	February 21, 2017 Email string from O. Felten to J. Bates re: March 8-10	R, H, 403, LF, MIL
TX0849	SINGULAR-00016522	SINGULAR-00016523	February 8, 2012 Email from Teller to Bates re: some personal feedback	R, H, 403, LF, MIL
TX0850	SINGULAR-00016662	SINGULAR-00016662	February 3, 2017 Email from T. Spalink to A. Teller cc: Bates re: Thanks	R, H, 403, LF, MIL
TX0851	SINGULAR-00017438	SINGULAR-00017439	June 27, 2011 Email chain from A. Teller to J. Bates re: how about this approach?	R, H, 403, LF, MIL
TX0852	SINGULAR-00017683	SINGULAR-00017683	March 9, 2011 Email from Teller to Bates re: Intro	R, H, 403, LF, MIL
TX0853	SINGULAR-00017909	SINGULAR-00017910	May 27, 2011 Email from Teller to Bates re: RYI	R, H, 403, LF, MIL
TX0854	SINGULAR-00017972	SINGULAR-00017973	November 24, 2013 Email string from Q. Le to J. Bates re moving forward, showing attachment "deepnetworks2.tar.gz"	R, H, 403, LF
TX0855	SINGULAR-00018114	SINGULAR-00018115	July 12, 2011 Email from Teller to Bates re: So I had an interesting conversation with Sebastian about possibly bringing you onboard...	R, H, 403, LF, MIL
TX0856	SINGULAR-00018125	SINGULAR-00018126	March 1, 2017 Email string from J. Wall to J. Bates cc: Tornabene re: March 8-10, showing Attachments: SingularComputingMANDA20170301.pdf	R, 403
TX0857	SINGULAR-00018127	SINGULAR-00018131	March 1, 2017 Mutual Confidentiality and Non-Disclosure Agreement between Google and Singular (not signed)	R, 403
TX0858	SINGULAR-00018150	SINGULAR-00018151	February 26, 2011 Email string from J. Bates to A. Ng, cc: A. Teller, re: Tom Dean GoogleX, "physically realistic" computing, guidance on image search problem	R, H, 403, LF, MIL
TX0859	SINGULAR-00018153	SINGULAR-00018154	January 11, 2011 Email from Teller to Bates re: news, thoughts	R, H, 403, LF, MIL
TX0860	SINGULAR-00018179	SINGULAR-00018179	January 6, 2017 Email chain from A. Teller to J. Bates re: West Coast in February	R, H, 403, LF

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0861 (DUPE of TX0860)	SINGULAR-00018179	SINGULAR-00018179	January 6, 2017 Email string from A. Teller to J. Bates re: Westcoast in February	R, H, 403, LF
TX0862	SINGULAR-00018182	SINGULAR-00018183	July 12, 2011 Email from Bates to Ng cc: Teller re: Quick question	R, H, 403, LF, MIL
TX0863	SINGULAR-00018188	SINGULAR-00018189	February 26, 2011 Email chain from A. Teller to A. Ng re: Fwd: GoogleX, "physically realistic" computing, guidance on image search problem	R, H, 403, LF, MIL
TX0864 (DUPE of TX0863)	SINGULAR-00018188	SINGULAR-00018189	February 26, 2011 Email from A. Teller to A. Ng, re: Fwd: GoogleX, "physically realistic" computing, guidance on image search problem	R, H, 403, LF, MIL
TX0865	SINGULAR-00018199	SINGULAR-00018226	February 2017 Singular Presentation slides "Approximate Computing, Embedded AI, Billion Core Systems" Joseph Bates	MIL; R; H; LF; 403; A, 701, 702, 703
TX0868	SINGULAR-00018252	SINGULAR-00018253	November 2, 2010 Email chain from A. Teller to J. Bates re: via Justin	R, H, 403, LF, MIL
TX0869 (DUPE of TX0868)	SINGULAR-00018252	SINGULAR-00018253	November 2, 2010 Email from Teller to Bates re: via Justin	R, H, 403, LF, MIL
TX0870	SINGULAR-00018255	SINGULAR-00018258	January 17, 2017 Email string from T. Spalink to J. Bates re: options on Feb 2nd Feb 6?	H, LF
TX0871	SINGULAR-00018267	SINGULAR-00018267	January 3, 2011 Email from A. Teller to J. Bates re: Any news on whether we can resolve the IP issues through a small change to the NDA?	R, H, 403, LF, MIL
TX0872 (DUPE of TX0871)	SINGULAR-00018267	SINGULAR-00018267	January 3, 2011 Email from Teller to Bates re: Any news on whether we can resolve the IP issues through a small change to the NDA?	R, H, 403, LF, MIL
TX0873	SINGULAR-00018268	SINGULAR-00018269	January 11, 2017 Email from Teller to Bates re: options on Feb 2 and Feb 6?	H, LF
TX0874	SINGULAR-00018276	SINGULAR-00018276	May 2, 2012 Email from Teller to Bates re: Do you have a chip for someone to play with and rough power and pricing info if they asked?	R, H, 403, LF, MIL
TX0875	SINGULAR-00018277	GOOG-SING-00018280	May 25, 2011 Email chain from A. Teller to J. Bates re: 10-Noon June 24, and hotels?	R, H, 403, LF, MIL
TX0876	SINGULAR-00018281	SINGULAR-00018282	November 2, 2010 Email chain from A. Teller to J. Bates re: via Justin	R, H, 403, LF, MIL
TX0877 (DUPE of TX0876)	SINGULAR-00018281	SINGULAR-00018282	November 2, 2010 Email from Teller to Bates re: via Justin	R, H, 403, LF, MIL
TX0878	SINGULAR-00018287	SINGULAR-00018287	June 27, 2011 Email from Teller to Bates re: Also	R, H, 403, LF, MIL
TX0879	SINGULAR-00018288	SINGULAR-00018306	January 24, 2014 Email from Joseph Bates to Nanette Boden re: recent slides, and enclosing Singular January 2014 Presentation slides "Many-Million Core Processors and their Applications"	R, H, 403, LF, MIL

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0880	SINGULAR-00018310	SINGULAR-00018321	November 3, 2010 Email from J. Bates to A. Teller re: via Justin enclosing November 2010 Presentation slides "Computing 10,000x More Efficiently" by Bates	R, H, 403, LF, MIL
TX0882	SINGULAR-00018324	SINGULAR-00018326	April 27, 2011 Email from Teller to Bates re: idea on IP	R, H, 403, LF, MIL
TX0883	SINGULAR-00018329	SINGULAR-00018330	February 23, 2011 Email from Teller to Ioffe cc Bates re: ref: Shumeet Baluja	R, H, 403, LF, MIL
TX0884	SINGULAR-00018331	SINGULAR-00018332	December 9, 2010 Email chain from A. Teller to J. Bates re: slides to discuss today at 11 PT	R, H, 403, LF, MIL
TX0885 (DUPE of TX0884)	SINGULAR-00018331	SINGULAR-00018332	December 9, 2010 Email from Teller to Bates re: slides to discuss today at 11 PT	R, H, 403, LF, MIL
TX0886	SINGULAR-00018339	SINGULAR-00018339	November 19, 2005 Email from Teller to Bates; Thrun re: re-Intro	R, H, 403, LF, MIL
TX0887	SINGULAR-00018355	SINGULAR-00018356	March 25, 2011 Email from Teller to Bats re: the path forward	R, H, 403, LF, MIL
TX0888	SINGULAR-00018357	SINGULAR-00018363	September 5, 2013 Email from Le to Bates re: Google Sept 17	R, H, 403, LF, MIL
TX0889	SINGULAR-00018364	SINGULAR-00018364	July 11, 2011 Email from Teller to Ng re: Quick question	R, H, 403, LF, MIL
TX0891	SINGULAR-00018412	SINGULAR-00018414	March 2, 2011 Email string from A. Ng to J. Bates, cc: A. Teller, re: Tom Dean (GoogleX, "physically realistic" computing, guidance on image search problem)	R, H, 403, LF, MIL
TX0892	SINGULAR-00018417	SINGULAR-00018417	May 22, 2011 Email from Teller to Bates re: Headline	R, H, 403, LF, MIL
TX0893	SINGULAR-00018418	SINGULAR-00018418	June 9, 2011 Email from Teller to Bates re: Are you around in Boston today or tomorrow?	R, H, 403, LF, MIL
TX0894	SINGULAR-00018422	GOOG-SING-00018423	June 22, 2011 Email chain from A. Teller to J. Bates re: applications, markets, deal questions	R, H, 403, LF, MIL
TX0895	SINGULAR-00018429	SINGULAR-00018431	May 29, 2016 Email from Teller to Bates re: FYI	R, H, 403, LF, MIL
TX0896	SINGULAR-00018432	SINGULAR-00018433	March 3, 2011 Email from Teller to Bates cc Taylor; Holck re: NDA with SINGULAR COMPUTING LLC	R, H, 403, LF, MIL
TX0898 (DUPE of TX0893)	SINGULAR-00018418	SINGULAR-00018418	June 9, 2011 Email chain from A. Teller to J. Bates re: Are you around in Boston today or tomorrow?	R, H, 403, LF, MIL
TX0899	SINGULAR-00020490	SINGULAR-00020490	February 20, 2018 Email from Bates to Kibune re: quote attaching Singular Quote for Fujitsu 20Feb2018.pdf	R, H, 403, LF, PK
TX0900	SINGULAR-00021851	SINGULAR-00021852	September 24, 2013 Email string from J. Bates to Q. Le re thoughts after meeting today	R, H, 403, LF, MIL
TX0901	SINGULAR-00021854	SINGULAR-00021854	September 17, 2013 Email from Dean to Bates re: Good to meet you	R, H, 403, LF, MIL
TX0902	SINGULAR-00021855	SINGULAR-00021856	December 9, 2010 Email from Teller to Thrun cc Bates re: discussion with Sebastian	R, H, 403, LF, MIL
TX0903	SINGULAR-00024106	SINGULAR-00024108	November 2016 Document "Singular Computing Status - November 2016" by J. Bates	MIL; R; H; LF; 403; A, 701, 702, 703
TX0904	SINGULAR-00026335	SINGULAR-00026335	April 1, 2017 Email from J. Bates to L. Bates, P. Connolly re Singular K-1	

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0905	SINGULAR-00026441	SINGULAR-00026495	June 6, 2013 Design Agreement between Intrinsix and the contracting agent Space and Naval Warfare Systems Center Pacific and Singular Computing	R, LF, H
TX0906	SINGULAR-00026902	SINGULAR-00026903	January 23, 2014 Email from Dean to Bates cc: Boden Good to meet you	R, H, 403, LF, MIL
TX0907	SINGULAR-00026942	SINGULAR-00026942	June 24, 2011 Email from J. Chen to J. Bates, Subject: Hello from Google	R, H, 403, LF, MIL
TX0908	SINGULAR-00026945	SINGULAR-00026949	January 20, 2017 Email string from J. Bates to T. Spalink re: Feb 2, Morning	H, LF
TX0909	SINGULAR-00026955	SINGULAR-00026955	May 18, 2011 Email from Teller to Bates re: James	R, H, 403, LF, MIL
TX0910	SINGULAR-00027001	SINGULAR-00027001	January 27, 2011 Email from Teller to Bates re: nda	R, H, 403, LF, MIL
TX0911	SINGULAR-00027037	SINGULAR-00027038	April 25, 2011 Email from Teller to Bates re: idea on IP	R, H, 403, LF, MIL
TX0912	SINGULAR-00027050	SINGULAR-00027050	May 18, 2011 Email from Teller to Bates, Gosling re: introduction	R, H, 403, LF, MIL
TX0913	SINGULAR-00027171	SINGULAR-00027171	July 1, 2011 Email from Teller to Treuille, Bates re: Introduction	R, H, 403, LF, MIL
TX0914	SINGULAR-00027194	SINGULAR-00027198	January 20, 2017 Email string from O. Felten to J. Bates re: Feb 2, Morning	H, LF
TX0915	SINGULAR-00027204	SINGULAR-00027206	February 25, 2011 Email string from Tom Dean to Joseph Bates Re: hardware for mind	R, H, 403, LF, MIL
TX0916	SINGULAR-00027218	SINGULAR-00027219	November 6, 2010 Email from Teller to Bates re: I'm in the lounge	R, H, 403, LF, MIL
TX0917	SINGULAR-00027392	SINGULAR-00027394	September 19, 2013 Email string from Joseph Bates to Jeff Dean re: Good to meet you, and enclosing executed March 1, 2011 MNDA between Google and Singular	R, H, 403, LF, MIL
TX0918	SINGULAR-00027393	SINGULAR-00027394	Non-Disclosure Agreement between Google and Singular executed on March 1, 2011	R, H, 403, LF, MIL
TX0919	SINGULAR-00027398	SINGULAR-00027398	March 26, 2011 Email from Teller to Bates re: summary of conversation on "refocusing collaboration"	R, H, 403, LF, MIL
TX0920	SINGULAR-00027459	SINGULAR-00027459	February 20, 2017 Email string from O. Felten to J. Bates re: March 8-10	H, LF
TX0921	SINGULAR-00027504	SINGULAR-00027508	July 1, 2011 Email from Teller to Bates Fwd: Can you confirm…	R, H, 403, LF, MIL
TX0922	SINGULAR-00027580	SINGULAR-00027580	July 13, 2011 Email from Bates to Teller re: Near term plan	R, H, 403, LF, MIL
TX0923	SINGULAR-00027633	SINGULAR-00027634	September 19, 2013 Email from Dean to Bates re: Good to meet you	R, H, 403, LF, MIL
TX0924	SINGULAR-00027639	SINGULAR-00027639	February 28, 2017 Email from Bates to Laudon BCC: Bates re: slides Attachments: X Approximate Computing, Embedded AI, Billion Core Systems Feb2017.pdf	H, LF
TX0925	SINGULAR-00027640	SINGULAR-00027667	2017 'Presentation slides "Approximate Computing, Embedded AI, Billion Core Systems" by Joseph Bates	MIL; R; H; LF; 403; A, 701, 702, 703
TX0926	SINGULAR-00036184-AAPL	SINGULAR-00036191-AAPL	September 18, 2017 Services and Evaluation License Agreement between Apple and Singular Computing	
TX0927	SINGULAR-00050752	SINGULAR-00050754	Singular Computing End User License Agreement for Evaluating Singular Technology	A, R, LF, H

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0928	SINGULAR-00054014	SINGULAR-00054047	ISO/IEC 30134-2 Information technology - Data centres - Key performance indicators - Part 2: Power usage effectiveness (PUE), ISO, April, 2016.	A; R; LF, 403, H, 703
TX0929	SINGULAR-00054067	SINGULAR-00054124	"NVIDIA TESLA V100 GPU ARCHITECTURE", NVIDIA, August, 2017, https://images.nvidia.com/content/voltaarchitecture/pdf/volta-architecture-whitepaper.pdf.	A; R; LF, 403, H
TX0930	SINGULAR-00054161	SINGULAR-00054161	Google Earth Lenoir NC.pdf	A; R; LF, 403, H
TX0931	SINGULAR-00054169	SINGULAR-00054719	ANSI/BICSI 002-2019, Data Center Design and Implementation Best Practices, BICSI, May, 2019.	A; R; LF, 403, H, 703
TX0932	SINGULAR-00054725	SINGULAR-00054879	ANSI BICSI 009-2019, Data Center Operations and Maintenance Best Practices, BICSI, May, 2019.	A; R; LF, 403, H
TX0933	SINGULAR-00054880	SINGULAR-00054903	Google Explore our Photo Gallery	
TX0934	SINGULAR-00054904	SINGULAR-00054904	Article "Data Centers Locations in North America", CyrusOne, https://cyrusone.com/north-america/.	A; R; LF, 403, H
TX0935	n/a	n/a	Article "Resolving the Data Center Staffing Shortage," Kevin Heslin, Uptime Institute, August 13, 2014, https://journal.uptimeinstitute.com/resolving-data-center-staffing-shortage/.	A; R; LF, 403, H
TX0936	SINGULAR-00055070	SINGULAR-00055075	Article "Data centre water consumption", by David Mytton, Nature Portfolio Journal, February 15, 2021, https://www.nature.com/articles/s41545-021-00101-w.	A; R; LF, 403, H
TX0937	n/a	n/a	Article "Google to Expand Its Charleston-Area Data Center Again," John McDermott, February 14, 2019	A; R; LF, 403, H
TX0938 (DUPE of TX0939)	SINGULAR-00055128	SINGULAR-00055129	April 30, 2018 Article "Expanding our GPU portfolio with NVIDIA Tesla V100" by Chris Kleban, Ari Libermana https://cloud.google.com/blog/products/gcp/expanding-our-gpu-portfolio-with-nvidia-tesla-v100.	A; R; LF, 403, H
TX0939	SINGULAR-00055128	SINGULAR-00055129	NVIDIA Tesla V100 GPUs and P100 GPUs on Google Cloud Blog	A; R; LF, 403, H
TX0940	SINGULAR-00055145	SINGULAR-0055147	September 2, 2015 Article "Cost Wars: Data Center vs. Public Cloud", by Tom Gillis Forbes, September 02, 2015, https://www.forbes.com/sites/tomgillis/2015/09/02/cost-wars-data-center-vs-public-cloud/?sh=42991e45923f.	A; R; LF, 403, H
TX0941	SINGULAR-00059457	SINGULAR-00059466	April 22, 2017 "Google data center in Berkeley County" - "Google's Controversial Groundwater withdrawal sparks question of who owns South Carolina water"	A; R; LF, 403, H
TX0942	SINGULAR-00055197	SINGULAR-00055212	Article "Data Center Outlook - A wave of global momentum" North America 2017, JLL	A; R; LF, 403, H
TX0943	SINGULAR-00055213	SINGULAR-00055213	Google Earth Douglas County April 3, 2022.pdf	A; R; LF, 403, H
TX0944	SINGULAR-00055214	SINGULAR-00055605	ANSI/BICSI 002-2011, Data Center Design and Implementation Best Practices, BICSI, March 2011.	A; R; LF, 403, H

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0945	n/a	n/a	Article "Start planning your Google I/O 2017 scheduler, Google, April 28, 2017, by Christopher Katsaros, https://developers.googleblog.com/2017/04/start-planning-your-google-io-2017.html.	A; R; LF, 403, H
TX0946	SINGULAR-00055623	SINGULAR-00055650	Article Data Center Outlook - North America 2016, JLL	A; R; LF, 403, H
TX0947	SINGULAR-00055651	SINGULAR-00055660	Article "Data Center 101 -The Basics", Data Center Huddle, http://web.archive.org/web/20170426032246/http://www.dchuddle.com/data-center-101/. (2011-2016)	A; R; LF, 403, H
TX0948	SINGULAR-00055661	SINGULAR-00055667	Article Regional footprint to meet all your data needs. "Digital Realty - North America", Digital Realty, https://www.digitalrealty.com/data-centers/north-america. (2023)	A; R; LF, 403, H
TX0949	SINGULAR-00055668	SINGULAR-00055668	Google Earth Dalles, OR 7-25-2021	A; R; LF, 403, H
TX0950	SINGULAR-00055669	SINGULAR-00055669	Google Earth Berkeley SC Data Center 1-29-21	A; R; LF, 403, H
TX0951	SINGULAR-00055673	SINGULAR-00055673	Google Earth Council Bluffs Data Center 6-13-2021	A; R; LF, 403, H
TX0952	SINGULAR-00055680	SINGULAR-00055682	Chapter 20 "Alternating-Current Power"	R, LF, 703, C, 403
TX0953	SINGULAR-00055683	SINGULAR-00055683	Google Earth Mayes County, OK Data Center	A; R; LF, 403, H
TX0954	SINGULAR-00055687	SINGULAR-00055752	"Google Environmental Report 2019", Google, September, 2019	A; R; LF, 403, H
TX0955	SINGULAR-00055753	SINGULAR-0055771	Article "Data Center Size and Density", AFCOM, White paper. September, 2014	A; R; LF, 403, H
TX0956	n/a	n/a	Article "24/7 Carbon-Free Energy: Powering up new clean energy projects across the globe", by Marc Oman, Ignacio Fernandez Stearns, Google, April 21, 2022, https://cloud.google.com/blog/topics/sustainability/clean-energy-projects-begin-to-power-googledata-centers.	A; R; LF, 403, H
TX0957	SINGULAR-00055788	SINGULAR-00055913	July 12, 2017 ANSI/TIA-942 Revision B, Telecommunications Infrastructure Standard for Data Centers, TIA	A; R; LF, 403, H
TX0958	SINGULAR-00055914	SINGULAR-00055967	ASHRAE Publication "Thermal Guidelines for Data Processing Environments" (2004)	A; R; LF, 403, H
TX0959	n/a	n/a	"Regions and zones", Google, https://cloud.google.com/compute/docs/regions-zones.	A; R; LF, 403, H
TX0960	SINGULAR-00056197	SINGULAR-00056202	April 9, 2018 Article "Google kicks off construction on $600M Alabama data center", by Jerry Underwood, Made In Alabama, April 09, 2018, https://www.madeinalabama.com/2018/04/google-kicks-off-construction-on-alabama-data-center/.	A; R; LF, 403, H
TX0961	SINGULAR-00056230	SINGULAR-00056203	Google Earth Council Bluffs IA - SLN June 13, 2021	A; R; LF, 403, H
TX0962	SINGULAR-00054721	SINGULAR-00054721	VIDEO: "Google Data Center 360 Tour - The Dalles", Google, March 23, 2016, https://www.youtube.com/watch?v=zDAYZU4A3w0.	A; R; LF, 403, H
TX0963	SINGULAR-00055615	SINGULAR-00055615	VIDEO: Joe Kava, "An Insider's Look: Google's Data Centers (Cloud Next '19)", Google, April 11, 2019, https://www.youtube.com/watch?v=yfF3pOzdmIE.	A; R; LF, 403, H

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0964	SINGULAR-00055616	SINGULAR-00055616	VIDEO: "What is a Data Center", Google, February 17, 2021, https://www.youtube.com/watch?v=Amow8BJm5Go.	A; R; LF, 403, H
TX0965	SINGULAR-00056211	SINGULAR-00056211	VIDEO: "Inside a Google data center-South Carolina", Google, December 16, 2014, https://www.youtube.com/watch?v=XZmGGAbHqa0.	A; R; LF, 403, H
TX0967	GOOG-SING-00007606	GOOG-SING-00007627	December 6, 2017 Presentation slides "Dragonfish Bringup Update"	R, 403, H, LF
TX0968	GOOG-SING-00008541	GOOG-SING-00008548	January 12, 2017 Google AI Blog Post "The Google Brain Team — Looking Back on 2016"	R, 403, H, LF
TX0969	GOOG-SING-00008549	GOOG-SING-00008558	January 11-12, 2018 Google AI Blog Posts "The Google Brain Team — Looking Back on 2017" Part 1 of 2 and Part 2 of 2	R, 403, H, LF
TX0970	GOOG-SING-00009620	GOOG-SING-00009645	January 15, 2019 Google AI Blog Posts "Looking Back at Google's Research Efforts in 2018" and January 9, 2020 "Google Research: Looking Back at 2019, and Forward to 2020 and Beyond"	R, 403, H, LF
TX0971	GOOG-SING-00028249	GOOG-SING-00028250	February 6, 2011 Email from J. Bates to A. Teller Re: FYI, business week article with attachment	R, 403, H, LF
TX0972	GOOG-SING-00079340	GOOG-SING-00079340	Spreadsheet "Finance COT Template," date last modified May 29, 2019	R, 403, H, LF
TX0973	GOOG-SING-00099909	GOOG-SING-00099921	November 29, 2018 Email chain from S. Kumar to N. Patil, cc to Z. Stone and others Re: [jellyfish-team] MLPerf 0.5 TPU Submission Update	R, 403, H, LF
TX0974	GOOG-SING-00177024	GOOG-SING-00177054	June 21, 2018 Presentation slides "TPU Performance and Scalability" by N. Kumar	R, 403, H, LF
TX0975	GOOG-SING-00242382	GOOG-SING-00242382	December 10, 2015 Email from D. Sculley to J. Dean re approximate computing chip -- joseph bates?	R, MIL, 403, H, LF
TX0976	GOOG-SING-00242398	GOOG-SING-00242398	February 3, 2017 Meeting Invite from O. Felten to J. Wall, C. Tornabene, T. Spalink re Singular Computing/X Discussion	R, 403, H, LF
TX0977	GOOG-SING-00242405	GOOG-SING-00242410	February 8, 2017 Email chain from O. Felten to T. Spalink, A. Teller re Fwd: Feb 2, Morning	R, 403, H, LF
TX0978	GOOG-SING-00242450	GOOG-SING-00242450	February 6, 2011 Email chain from A. Teller to J. Bates Re: FYI, business week article	R, 403, H, LF
TX0979	GOOG-SING-00243078	GOOG-SING-00243078	November 21, 2008 Meeting Invite from P. Norvig to A. Spector Re: CONF CALL: Peter/Alfred with Joe Bates	R, MIL, 403, H, LF
TX0980	GOOG-SING-00243079	GOOG-SING-00243079	November 21, 2008 Email chain from S. Baluja to P. Norvig, cc to B. Bayer Re: next steps on "imperfect hardware"	R, MIL, 403, H, LF
TX0981	GOOG-SING-00243119	GOOG-SING-00243120	November 6, 2008 Email chain from J. Bates to S. Baluja Re: I mean, let's try Nov 13th	R, MIL, 403, H, LF
TX0982	GOOG-SING-00243121	GOOG-SING-00243123	November 14, 2008 Email chain from J. Bates to S. Baluja Re: post-meeting Thursday	R, MIL, 403, H, LF
TX0983	GOOG-SING-00243129	GOOG-SING-00243131	December 16, 2008 Email chain from S. Baluja to J. Bates Re: Thurs 12-1:30	R, MIL, 403, H, LF

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX0984	GOOG-SING-00243132	GOOG-SING-00243132	December 18, 2008 Email chain from S. Baluja to J. Bates Re: confirming Noon today	R, MIL, 403, H, LF
TX0985	GOOG-SING-00243164	GOOG-SING-00243165	December 19, 2008 Email chain from J. Bates to S. Baluja Re: thanks for lunch	R, MIL, 403, H, LF
TX0986	GOOG-SING-00243174	GOOG-SING-00243175	February 6, 2011 Email from J. Bates to S. Baluja Re: FYI, business week article with attachment	R, MIL, 403, H, LF
TX0987	GOOG-SING-00243984	GOOG-SING-00243984	June 28, 2012 Email chain from J. Dean to D. Golovin Re: links: approx arithmetic using fewer transistors	R, MIL, 403, H, LF
TX0988	GOOG-SING-00243985	GOOG-SING-00243986	June 28, 2012 Email chain from L. Barroso to J. Dean Re: links: approx arithmetic using fewer transistors	R, MIL, 403, H, LF
TX0989	n/a	n/a	"What Is MLPerf?" Nvidia, available at https://www.nvidia.com/en-us/datacenter/resources/mlperf-benchmarks/	H, LF, 403, 703
TX0990	n/a	n/a	"Efficiency," Google Data Centers, available at https://www.google.com/about/datacenters/efficiency/	R, LF, 403, 703
TX0991	n/a	n/a	"FAQ," Levels.fyi, available at https://www.levels.fyi/verified/	R, MIL, 403, H, LF
TX0992	n/a	n/a	"Google Software Engineer Salaries," Levels.fyi, available at https://www.levels.fyi/companies/google/salaries/softwareengineer?limit=50&offset=0&sortOrder=ASC&country=254&sortBy=total_compensation.	R, MIL, 403, H, LF
TX0993	n/a	n/a	Article "Proofs as Programs" by J. L Bates and R. L. Constable, ACM Transactions on Programming Languages and Systems, January 1985	R, 403, H, LF
TX0994	n/a	n/a	LinkedIn page of M. Mabey accessed November 8, 2023 (Mabey Ex. 1)	R, 403, H, LF
TX0995	n/a	n/a	February 25, 2022 Twitter (X) Post by R. Solé re Artificial Intelligence	R, 403, H, LF
TX0996	n/a	n/a	Article "Personality-Rich Believable Agents That Use Language" by A. B. Loyall and J. Bates, ACM, 1997	R, 403, H, LF
TX0997	n/a	n/a	Article "Convolutional Back Projection on the S1 Reduced Precision Processor" by M. Holzrichter and R. Spaulding, Sandia National Laboratories, 2018	
TX0998	n/a	n/a	Wayback Machine Internet Archive Affidavit re http://web.archive.org/web/20120221052839/http://web.media.mit.edu/~bates/Summary_files/BatesTalk.pdf	
TX0999	n/a	n/a	Wayback Machine Internet Archive Affidavit re http://web.archive.org/web/20120221094709/http://web.media.mit.edu/~bates/Summary_files/BatesTalk.pdf	
TX2000	n/a	n/a	Wayback Machine Internet Archive Affidavit re http://web.archive.org/web/20120221184802/http://web.media.mit.edu/~bates/Summary_files/BatesTalk.pdf	

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX2001	n/a	n/a	Wayback Machine Internet Archive Affidavit re http://web.archive.org/web/20120221231608/http://web.media.mit.edu/~bates/Summary_files/BatesTalk.pdf	
TX2002	n/a	n/a	Wayback Machine Internet Archive Affidavit re http://web.archive.org/web/20120226224311/http://web.media.mit.edu/~bates/Summary_files/BatesTalk.pdf	
TX2003	n/a	n/a	Wayback Machine Internet Archive Affidavit re http://web.archive.org/web/20131012082745/http://web.media.mit.edu/~bates/Summary_files/BatesTalk.pdf	
TX2004	n/a	n/a	Wayback Machine Internet Archive Affidavit re http://web.archive.org/web/20131107110807/http://web.media.mit.edu/~bates/Summary_files/BatesTalk.pdf	
TX2005	n/a	n/a	Wayback Machine Internet Archive Affidavit re http://web.archive.org/web/20140723054905/http://web.media.mit.edu/~bates/Summary_files/BatesTalk.pdf	
TX2006	SINGULAR-00006723	SINGULAR-00006725	June 2011 J. Bates Notes for Google visit June 24, 2011	R, H, A, 403, 701, 702, 703, 704, MIL
TX2007	SINGULAR-00006800	SINGULAR-00006801	April 29, 2011 J. Bates Notes re Sketch of MNDA amendment 28Apr11	R, H, A, 403, 701, 702, 703, 704, MIL
TX2008	SINGULAR-00011049	SINGULAR-00011049	July 30, 2015 Signature Page to Evaluation License Agreement between Singular Computing and Sandia Corporation	R, H, A, 403
TX2009	SINGULAR-00015244	SINGULAR-00015251	Article "Nurturing Genius" by T. Clynes, Scientific American, January/February 2017	R, H, A, LF, 403, MIL
TX2010	SINGULAR-00016434	SINGULAR-00016434	Article "Innovator: Joseph Bates" by P. Burrows, Bloomberg Business Week, January-February 2011	R, H, A, LF, 403, MIL
TX2011	SINGULAR-00018116	SINGULAR-00018121	August 28, 2013 Email chain from J. Bates to Q. Le Re: learning with approximate computers, Stanford Aug 15	R, H, A, 403, MIL
TX2012	SINGULAR-00022607	SINGULAR-00022617	Article "A Child Genius, at 62" by P. Smith, Topic Magazine, December 2017	R, H, A, LF, 403, MIL
TX2013	SINGULAR-00022626	SINGULAR-00022626	Article “Why a Chip That’s Bad at Math Can Help Computers Tackle Harder Problems” by T. Simonite, MIT Technology Review	R, H, A, LF, 403
TX2014	SINGULAR-00024986	SINGULAR-00024988	August 25, 2014 Email chain from M. Furst to J. Bates Re: Hi	R, H, A, 403, MIL
TX2015	SINGULAR-00050434	SINGULAR-00050456	September 17, 2012 Evaluation License Agreement between Singular Computing and Charles River Analytics, Inc.	R, H, A, 403
TX2016	SINGULAR-00050568	SINGULAR-00050573	January 20, 2018 Evaluation License Agreement between Singular Computing and NextDroid Robotics	R, H, A, 403
TX2017	SINGULAR-00061253	SINGULAR-00061371	April 21, 2005 - April 11, 2007 Joseph Bates Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.01	SINGULAR-00061253	SINGULAR-00061257	April 21, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.02	SINGULAR-00061258	SINGULAR-00061259	April 27, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX2017.03	SINGULAR-00061259	SINGULAR-00061259	April 29, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.04	SINGULAR-00061266	SINGULAR-00061270	June 14, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.05	SINGULAR-00061271	SINGULAR-00061271	June 17, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.06	SINGULAR-00061274	SINGULAR-00061274	July 8, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.07	SINGULAR-00061275	SINGULAR-00061276	August 10, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.08	SINGULAR-00061277	SINGULAR-00061279	August 24, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.09	SINGULAR-00061280	SINGULAR-00061280	September 8, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.10	SINGULAR-00061281	SINGULAR-00061282	October 22, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.11	SINGULAR-00061283	SINGULAR-00061285	November 3, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.12	SINGULAR-00061286	SINGULAR-00061288	November 12, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.13	SINGULAR-00061289	SINGULAR-00061292	November 23, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.14	SINGULAR-00061292	SINGULAR-00061293	December 7, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.15	SINGULAR-00061294	SINGULAR-00061299	December 10, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.16	SINGULAR-00061300	SINGULAR-00061305	December 13, 2005 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.17	SINGULAR-00061311	SINGULAR-00061311	January 11, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.18	SINGULAR-00061313	SINGULAR-00061315	January 15, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.19	SINGULAR-00061316	SINGULAR-00061316	January 18, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.20	SINGULAR-00061317	SINGULAR-00061317	February 9, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.21	SINGULAR-00061318	SINGULAR-00061319	February 16, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.22	SINGULAR-00061320	SINGULAR-00061323	June 27, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.23	SINGULAR-00061324	SINGULAR-00061330	July 18, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL

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Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX2017.24	SINGULAR-00061331	SINGULAR-00061339	July 23, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.25	SINGULAR-00061340	SINGULAR-00061342	August 18 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.26	SINGULAR-00061343	SINGULAR-00061344	September 24, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.27	SINGULAR-00061345	SINGULAR-00061353	October 4, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.28	SINGULAR-00061354	SINGULAR-00061357	October 11, 1006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.29	SINGULAR-00061358	SINGULAR-00061362	November 7, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.30	SINGULAR-00061363	SINGULAR-00061364	November 28, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.31	SINGULAR-00061365	SINGULAR-00061366	December 19, 2006 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.32	SINGULAR-00061367	SINGULAR-00061368	January 5, 2007 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.33	SINGULAR-00061369	SINGULAR-00061369	March 23, 2007 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2017.34	SINGULAR-00061369	SINGULAR-00061371	April 11, 2007 Entries from Joseph Bates' Notebook	R, H, A, 403, 701, 702, 703, 704, MIL
TX2018	SINGULAR-00061372	SINGULAR-00061401	2006 Joseph Bates' Notebook Contents	R, H, A, 403, 701, 702, 703, 704, MIL
TX2018.01	SINGULAR-00061372	SINGULAR-00061385	July 12, 2006 Excerpt of Joseph Bates' Notebook Contents	R, H, A, 403, 701, 702, 703, 704, MIL
TX2018.02	SINGULAR-00061391	SINGULAR-00061391	Excerpt of Joseph Bates' Notebook Contents	R, H, A, 403, 701, 702, 703, 704, MIL
TX2018.03	SINGULAR-00061392	SINGULAR-00061393	Excerpt of Joseph Bates' Notebook Contents	R, H, A, 403, 701, 702, 703, 704, MIL
TX2018.04	SINGULAR-00061394	SINGULAR-00061394	Excerpt of Joseph Bates' Notebook Contents	R, H, A, 403, 701, 702, 703, 704, MIL
TX2018.05	SINGULAR-00061395	SINGULAR-00061396	Excerpt of Joseph Bates' Notebook Contents	R, H, A, 403, 701, 702, 703, 704, MIL
TX2018.06	SINGULAR-00061397	SINGULAR-00061401	February 1, 2006 Excerpt of Joseph Bates' Notebook Contents	R, H, A, 403, 701, 702, 703, 704, MIL
TX2019	SNL-0002389	SNL-0002389	July 30, 2015 Evaluation License Agreement between Singular Computing and Sandia Corporation	R; H; A; 403
TX2020	GOOG-SING-00243996	GOOG-SING-00243997	Excel Spreadsheet "Jelly and Dragon Deployments"	Objections reserved
TX2021	n/a	n/a	December 1, 2023 Defendant's Sixth Supplemental Responses and Objections to Plaintiff's Fifth Set of Interrogatories (No. 23)	Objections reserved
TX2022	GOOG-SING-00243992	GOOG-SING-00243992	Excel Spreadsheet Internal Google Only, No Cloud	Objections reserved
TX2023	GOOG-SING-00243993	GOOG-SING-00243993	Excel Spreadsheet Internal Google Only, No Cloud	Objections reserved

Singular Computing's Trial Exhibit List

Trial Exhibit No.	Bates Beg	Bates End	Description	Objection(s)
TX2024	GOOG-SING-00243994	GOOG-SING-00243994	Excel Spreadsheet Internal Google Only, No Cloud & Global	Objections reserved
TX2025	GOOG-SING-00243995	GOOG-SING-00243995	Excel Spreadsheet Internal Google Only, No Cloud & Global	Objections reserved